Order No. MAC0205021C2

Service Manual

Multi-Split Air Conditioner

CS-V9BKPG CU-2V14BKP5G / CS-V9BKPG CU-2V18BKP5G / CS-V9BKPG CU-3V20BKP5G / CS-V7BKPG CU-2V19BKP5G / CS-V12BKPG

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⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

⚠ PRECAUTION OF LOW TEMPERATURE

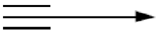
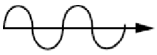
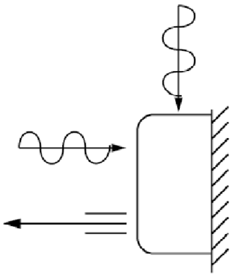
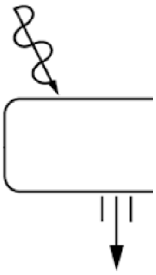
In order to avoid frostbite, be assured of no refrigerant leakage during the installation or repairing of refrigeration circuit.

1. Features

- High Efficiency
- Compact Design
- Comfort Environment
- 8 hours of sleep mode operation
- Air filter with function to reduce dust and smoke
- Wider range of horizontal discharge air
- Auto Restart
- Random auto restart after power failure for safety restart operation
- Removable and Washable Front Panel
- Remote Control Self-illuminating Button
- Catechin Air Purifying Filter
- Trap dust, tobacco smoke and tiny particles
- Prevent the growth of bacteria and viruses trapped
- Solar Refreshing Deodorizing Filter
- Remove unpleasant odour from the air
- Quality Improvement
- Gas leakage protection
- Prevent compressor reverse cycle
- 2-stage OLP to protect compressor
- Noise prevention during soft dry operation.
- Anti-dew Formation Control (Cooling & Soft Dry)
- Operation Improvement
- Economy mode to reduce electrical power consumption
- Powerful mode to reach the desired room temperature quickly
- Long Installation Piping
- Long piping up to 15 meter
- 24-hour Timer Setting
- Environmental Friendly
- R410A, which does not contain chlorine, is used as its refrigerant, so there is no danger of damage to the ozone layer in stratosphere.

2. Functions

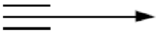
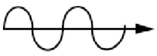
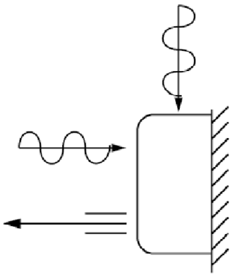
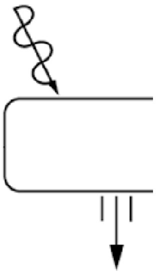
3. Product Specifications

		Unit	CS-V9BKPG	CU-2V14
Power Source		**Phase** **V** **Cycle**	**Single** **230** **50**	
Cooling Capacity		**kW** **kcal/h**	**(1 unit) 3.00** **2,580**	**(2 units) 3.70** **3,180**
Moisture Removal		**l/h** **Pint/h**	**(1 unit) 1.7** **3.6**	**(2 units) 2.2** **4.6**
Airflow Method		**OUTLET**  **INTAKE** 	**SIDE VIEW** 	**TOP VI** 
Air Volume	**Indoor Air (Lo)**	**m3/min (cfm)**	**6.8 (240)**	**—**
	Indoor Air (Me)	**m3/min (cfm)**	**8.0 (280)**	**—**
	Indoor Air (Hi)	**m3/min (cfm)**	**9.9 (350)**	**—**
	Indoor Air (SHi)	**m3/min (cfm)**	**10.9 (380)**	**—**
Noise Level		**dB (A)**	**High 36, Low 26**	**High**
		Power level dB	**High 49**	**High**

Electrical Data	**Input**		**W**	**(1 unit) 1,180**	**(2 units) 1,240**
	Running Current		**A**	**(1 unit) 5.3**	**(2 units) 5.6**
	EER		**W/W** **kcal/hW**	**(1 unit) 2.54** **2.19**	**(2 units) 2.98** **2.56**
	Starting Current		**A**	**17.8**	
Piping Connection Port **(Flare piping)**			**inch** **inch**	**G ; Half Union 3/8”** **L ; Half Union 1/4”**	**G ; 3-way va** **L ; 3-way va**
Pipe Size **(Flare piping)**			**inch** **inch**	**G (gas side) ; 3/8”** **L (liquid side) ; 1/4”**	**G (gas side** **L (liquid sid**
Drain	**Inner diameter**		**mm**	**12**	**—**
Hose	**Length**		**m**	**0.7**	**—**
Dimensions	**Height**		**inch (mm)**	**10 - 13/16 (275)**	**21 - 1/4 (**
	Width		**inch (mm)**	**31 - 15/32 (799)**	**29 - 15/16**
	Depth		**inch (mm)**	**8 - 9/32 (210)**	**9 - 7/8 (**
Net Weight			**lb (kg)**	**20 (9.0)**	**75 (34**
Compressor		**Type**		**—**	**Rotary (1 c** **rolling pist**
	Motor	**Type**		**—**	**Induction (**
	Rated	**Output**	**W**	**—**	**830**
Air Circulation		**Type**		**Cross-flow Fan**	**Propeller**
		Material		**AS + Glass Fiber 20%**	**AS + Glass F**
	Motor	**Type**		**Induction (4-poles)**	**Induction (**
		Input	**W**	**29.3**	**39.4**
		Rated Output	**W**	**15**	**15**
	Fan Speed	**Low**	**rpm**	**800**	**—**
		Medium	**rpm**	**940**	**—**
		High	**rpm**	**1,160**	**795**
		SuperHigh	**rpm**	**1,250**	**—**
Heat Exchanger	**Description**			**Evaporator**	**Conder**
	Tube material			**Copper**	**Copp**
	Fin material			**Aluminium**	**Alumin**
	Fin Type			**Slit Fin**	**Louver**
	Row / Stage			**(Plate fin configuration, forced dr**	
				2 × 15	**1 × 2**
	FPI			**19**	**17**
	Size (W × H × L)		**mm**	**610 × 315 × 25.4**	**687 × 508**
Refrigerant Control Device				**—**	**Capillary**
Refrigeration Oil			**(c.c)**	**—**	**SUNISO 4G** **ATMOS M6**
Refrigerant (R410A)			**g (oz)**	**—**	**970 (34**
Thermostat				**Electronic Control**	**—**

Protection Device			**—**	**Overload P**
Capillary Tube	**Length**	**mm**	**—**	**615**
	Flow Rate	**l/min**	**—**	**14.4**
	Inner Diameter	**mm**	**—**	**1.6**
Air Filter	**Material**	**(c.c)**	**P.P.**	**—**
	Style		**Honeycomb**	
Capacity Control			**Capillary Tube**	
Compressor Capacitor		**μF, VAC**	**—**	**35 μF, 4**
Fan Motor Capacitor		**μF, VAC**	**1.5 μF, 400 VAC**	**1.0 μF, 4**

- Specifications are subject to change without notice for further improvement.

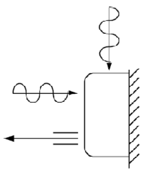
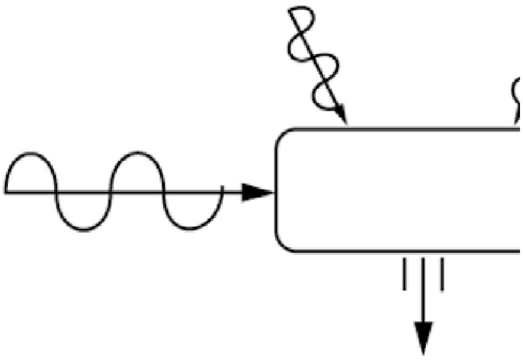
		Unit	**CS-V9BKPG**	**CU-2V18B**
Power Source		**Phase** **V** **Cycle**	**Single** **230** **50**	
Cooling Capacity		**kW** **kcal/h**	**(1 unit) 2.73** **2,350**	**(2 units) 5.46** **4,700**
Moisture Removal		**l/h** **Pint/h**	**(1 unit) 1.6** **3.4**	**(2 units) 3.0** **6.3**
Airflow Method		**OUTLET**  **INTAKE** 	**SIDE VIEW** 	**TOP VI** 
Air Volume	**Indoor Air (Lo)**	**m3/min (cfm)**	**6.8 (240)**	**—**
	Indoor Air (Me)	**m3/min (cfm)**	**8.0 (280)**	**—**
	Indoor Air (Hi)	**m3/min (cfm)**	**9.9 (350)**	**—**
	Indoor Air (SHi)	**m3/min (cfm)**	**10.9 (380)**	**—**

Noise Level			dB (A)	High 36, Low 26	High
			Power level dB	High 49	High
Electrical Data	Input		W	(1 unit) 860	(2 uni 1,72
	Running Current		A	(1 unit) 3.9	(2 uni 7.8
	EER		W/W (kcal/ hW)	3.17 (2.73)	
	Starting Current		A	15.9	
Piping Connection Port (Flare piping)			inch inch	G ; Half Union 3/8” L ; Half Union 1/4”	G ; 3-way v L ; 3-way v
Pipe Size (Flare piping)			inch inch	G (gas side) ; 3/8” L (liquid side) ; 1/4”	G (gas sid L (liquid sid
Drain Hose	Inner diameter		mm	12	—
	Length		m	0.7	—
Dimensions	Height		inch (mm)	10 - 13/16 (275)	25 - 21/32
	Width		inch (mm)	31 - 15/32 (799)	35 - 3/16
	Depth		inch (mm)	8 - 9/32 (210)	13 - 19/32
Net Weight			lb (kg)	20 (9.0)	141 (
Compressor		Type		—	Rotary (1 c rolling pist
	Motor	Type		—	Induction (
	Rated	Output	W	—	780
Air Circulation		Type		Cross-flow Fan	Propelle
		Material		AS + Glass Fiber 20%	AS + Glass
	Motor	Type		Induction (4-poles)	Induction (
		Input	W	29.3	123.
		Rated Output	W	15	50
	Fan Speed	Low	rpm	800	—
		Medium	rpm	940	—
		High	rpm	1,160	760
		SuperHigh	rpm	1,250	—

Heat Exchanger	Description		Evaporator	Conder
	Tube material		Copper	Copp
	Fin material		Aluminium	Alumin
	Fin Type		Slit Fin	Louver
	Row / Stage		(Plate fin configuration, forced dr	
			2 × 15	2 × 2
	FPI		19	14
	Size (W × H × L)	mm	610 × 315 × 25.4	560 × 609.
Refrigerant Control Device			—	Capillary
Refrigeration Oil		(c.c)	—	SUNISO 4G ATMOS M6
Refrigerant (R410A)		g (oz)	—	880 × 2 (31
Thermostat			Electronic Control	—
Protection Device			—	Overload P
Capillary Tube	Length	mm	—	1,16
	Flow Rate	l/min	—	7.0
	Inner Diameter	mm	—	1.4
Air Filter	Material Style	(c.c)	P.P. Honeycomb	—
Capacity Control			Capillary Tube	
Compressor Capacitor		μ F, VAC	—	30 μ F, 37
Fan Motor Capacitor		μ F, VAC	1.5 μ F, 400 VAC	3.0 μ F, 4

- Specifications are subject to change without notice for further improvement.

	Unit	CS-V9BKPG	CU-3V20BKP5G				
		Single Operation (A, B1, B2)	Single Operation		Double Operation		
			(A)	(B1 or B2)	(B1 + B2)	(A + B1 or B2)	
Power Source	Phase V Cycle	Single 230 50					
Cooling Capacity Per Unit	kW kcal/h	—	2.73 2,350	2.95 2,540	3.82 3,290	5.68 4,890	
Moisture Removal	l/h Pint/h	—	1.6 3.4	1.7 3.6	2.2 4.6	3.1 6.6	

Airflow Method		OUTLET INTAKE	SIDE VIEW 	TOP VIEW 			
Air Volume	**Indoor Air (Lo)**	m3/ min (cfm)	6.8 (240)	—			
	Indoor Air (Me)	m3/ min (cfm)	8.0 (280)	—			
	Indoor Air (Hi)	m3/ min (cfm)	9.9 (350)	—			
	Indoor Air (SHi)	m3/ min (cfm)	10.9 (380)	—			
Noise Level		dB (A)	High 36, Low 26	High 56			
		Power level dB	High 49	High 71			
Electrical Data	**Input**	W	50	910	1,120	1,200	1,940
	Running Current	A	0.23	4.1	5.0	5.3	8.6
	EER	W/W (kcal/ hW)	—	3.00 2.58	2.63 2.27	3.18 2.74	2.93 2.52
	Starting Current	A	(A unit) 15.9	(B unit) 17.8			
Piping Connection Port (Flare piping)		inch inch	G ; Half Union 3 /8” L ; Half Union 1 /4”	G ; 3-way valve 3/8” L ; 3-way valve 1/4”			

Pipe Size (Flare piping)			**inch inch**	**G (gas side) ; 3/8” L (liquid side) ; 1/4”**	**G (gas side) ; 3/8” L (liquid side) ; 1/4”**
Drain Hose	**Inner diameter**		**mm**	**12**	**—**
	Length		**m**	**0.7**	**—**
Dimensions	**Height**		**inch (mm)**	**10 - 13/16 (275)**	**25 - 21/32 (651)**
	Width		**inch (mm)**	**31 - 15/32 (799)**	**35 - 3/16 (893)**
	Depth		**inch (mm)**	**8 - 9/32 (210)**	**13 - 19/32 (345)**
Net Weight			**lb (kg)**	**20 (9.0)**	**146 (66)**
Compressor		**Type**		**—**	**Rotary (1 cylinder) rolling piston type**
	Motor	**Type**		**—**	**Induction (2-poles)**
	Rated	**Output**	**W**	**—**	**(A unit) 780 (B unit**
Air Circulation		**Type**		**Cross-flow Fan**	**Propeller Fan**
		Material		**AS + Glass Fiber 20%**	**AS + Glass Fiber 20%**
	Motor	**Type**		**Induction (4-poles)**	**Induction (6-poles)**
		Input	**W**	**29.3**	**123.0**
	Rated	**Output**	**W**	**15**	**50**
	Fan Speed	**Low**	**rpm**	**800**	**—**
		Medium	**rpm**	**940**	**—**
		High	**rpm**	**1,160**	**760**
		SuperHigh	**rpm**	**1,250**	**—**
Heat Exchanger	**Description**			**Evaporator**	**Condenser**
	Tube material			**Copper**	**Copper**
	Fin material			**Aluminium**	**Aluminium**
	Fin Type			**Slit Fin**	**Louver Fin**
	Row / Stage			**(Plate fin configuration, forced draft)**	
				2 × 15	**2 × 24**
	FPI			**19**	**14**
	Size (W × H × L)		**mm**	**610 × 315 × 25.4**	**756.0 × 609.6 × 719.5 44**
Refrigerant Control Device				**—**	**Capillary Tube**
Refrigeration Oil			**(c.c)**	**—**	**SUNISO 4GDID or ATMOS M60 (330, 3**
Refrigerant (R410A)			**g (oz)**	**—**	**(A unit) 780 (27.5) (B unit) 1,000 (35.3)**
Thermostat				**Electronic Control**	**—**
Protection Device				**—**	**Overload Protector**

Capillary Tube	Length Flow Rate Inner Diameter	mm l/min mm	— — —	780, 645, 950 16.2/13.5, 8.0 1.8, 1.6, 1.4
Air Filter	Material Style		P.P. Honeycomb	—
Capacity Control			Capillary Tube	
Compressor Capacitor		µ F, VAC	—	30/35 µ F, 370 VAC
Fan Motor Capacitor		µ F, VAC	1.5 µ F, 400 VAC	3.0 µ F, 450 VAC

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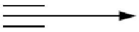
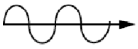
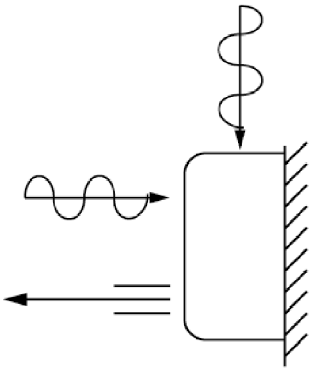
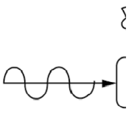
	Unit	One Unit (A) CS-V12BKPG	One Unit (B) CS-V7BKPG	CU-2V1
Cooling Capacity	kW kcal/h	(A) 3.55 (A) 3,050	(B) 2.10 (B) 1,810	(A+B (A+B)
Moisture Removal	l/h Pint/h	(A) 2.1 4.4	(B) 1.4 3.0	(A+B) 3 6.
Power Source	Phase V Cycle	Single 230 50		
Airflow Method	OUTLET  INTAKE 	SIDE VIEW 		TOP 

Air Volume	**Indoor Air (Lo)**	**m3/min (cfm)**	**7.3 (260)**	**6.4 (230)**	**–**
	Indoor Air (Me)	**m3/min (cfm)**	**8.7 (310)**	**7.4 (260)**	**–**
	Indoor Air (Hi)	**m3/min (cfm)**	**10.2 (360)**	**8.5 (300)**	**–**
	Indoor Air (SHi)	**m3/min (cfm)**	**10.5 (370)**	**9.4 (330)**	**–**
Noise Level		**dB (A)**	**(A) High 39 Low 29**	**(B) High 33 Low 26**	**Hig**
		Power level dB	**(A) High 52**	**(B) High 46**	**Hig**
Electrical Data	**Input**	**W**	**(A) 1,230**	**(B) 720**	**(A+B) 1,**
	Running Current	**A**	**(A) 5.5**	**(B) 3.2**	**(A+B) 8.**
	EER	**W/W (kcal/ hW)**	**(A) 2.89 (2.48)**	**(B) 2.92 (2.51)**	**(A+B) 3. (2**
	Starting Current	**A**	**(A) 17.8**	**(B) 12.5**	**(A+B) 3**
Piping Connection Port (Flare piping)		**inch inch**	**G ; Half Union 1/2”, 3/8” L ; Half Union 1/4”, 1/4”**		**G ; 3-way 3/ L ; 3-way 1/**
Pipe Size (Flare piping)		**inch inch**	**G (gas side) ; 1/2”, 3/8” L (liquid side) ; 1/4”, 1/4”**		**G (gas sid 8 L (liquid si 1/**
Drain Hose	**Inner diameter**	**mm**	**12**		**–**
	Length	**m**	**0.7**		**–**
Dimensions	**Height**	**inch (mm)**	**10 - 13/16 (275)**		**25 - 21/**
	Width	**inch (mm)**	**31 - 15/32 (799)**		**35 - 3/1**
	Depth	**inch (mm)**	**8 - 9/32 (210)**		**13 - 19/**
Net Weight		**lb (kg)**	**20 (9.0)**		**146**
Compressor	**Type**		**—**		**Rotary (1 rolling pi**
	Motor Type		**—**		**Induction**
	Rated Output	**W**	**(A) 830**	**(B) 670**	**(A+B)**

Air Circulation		**Type**		**Cross-flow Fan**		**Propel**
		Material		**AS + Glass Fiber 20%**		**AS + Gla 20**
	Motor	**Type**		**Induction (4-poles)**		**Induction**
		Input	**W**	**(A) 28.7**	**(B) 20.6**	**12**
		Rated Output	**W**	**15**		**5**
	Fan Speed	**Low**	**rpm**	**(A) 900**	**(B) 800**	**–**
		Medium	**rpm**	**(A) 1,080**	**(B) 920**	**–**
		High	**rpm**	**(A) 1,260**	**(B) 1,050**	**7**
		SuperHigh	**rpm**	**(A) 1,300**	**(B) 1,140**	**–**
Heat Exchanger	**Description**			**Evaporator**		**Cond**
	Tube material			**Copper**		**Cop**
	Fin material			**Aluminium**		**Alum**
	Fin Type			**Slit Fin**		**Louv**
	Row / Stage			**(Plate fin configuration, forced draft**		
				(A) 2 × 15	**(B) 2 × 15**	**2 ×**
	FPI			**21**	**19**	**1**
	Size (W × H × L)		**mm**	**610 × 315 × 25.4**		**756 × 719.5**
Refrigerant Control Device				**—**		**Capilla**
Refrigeration Oil			**(c.c)**	**—**		**SUNISO ATMOS 33**
Refrigerant (R410A)			**g (oz)**	**—**		**(A) 1,05 (B) 86**
Thermostat				**Electronic Control**		**–**
Protection Device				**—**		**Overload**
Capillary Tube	**Length**		**mm**	**—**		**(A) 1,16**
	Flow Rate		**l/min**	**—**		**(A) 10.**
	Inner Diameter		**mm**	**—**		**(A) 1.6**
Air Filter	**Material**		**(c.c)**	**P.P.**		**–**
	Style			**Honeycomb**		
Capacity Control				**Capillary Tube**		
Compressor Capacitor			**µ F, VAC**	**—**		**(A) 35 µ (B) 25 µ**
Fan Motor Capacitor			**µ F, VAC**	**1.5 µ F, 400 VAC**		**3.0 µ F,**

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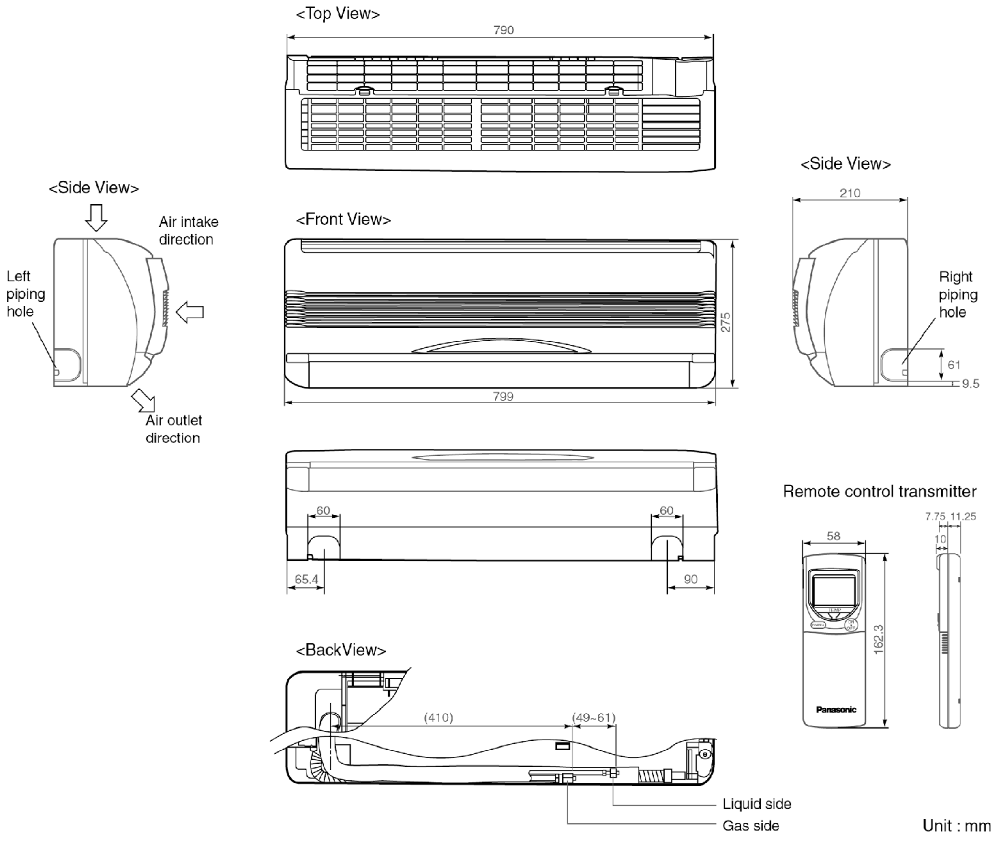
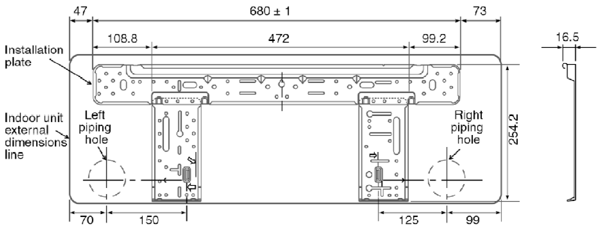
4. Dimensions

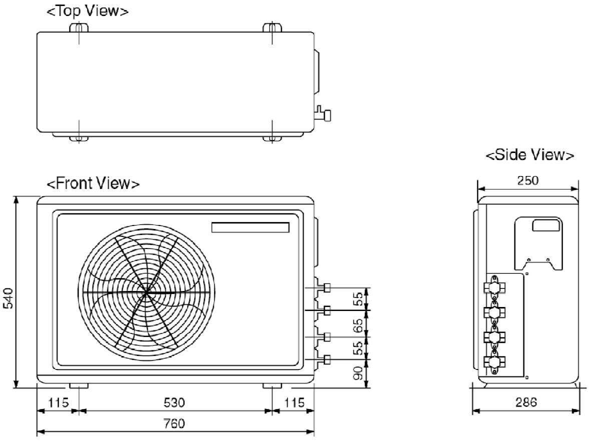
CS-V7BK / CS-V9BK / CS-V12BK


<Top View>
790
<Side View>
Air intake direction
Left piping hole
Air outlet direction
<Front View>
275
799
<Side View>
210
Right piping hole
61
9.5
60
60
65.4
90
Remote control transmitter
7.75
11.25
10
58
162.3
Panasonic
<BackView>
(410)
(49~61)
Liquid side
Gas side
Unit : mm

Relative position between the indoor unit and the installation plate <Front View>

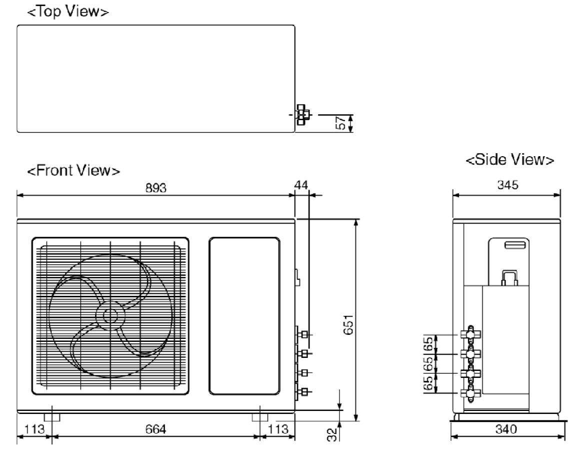

47
680 ± 1
73
108.8
472
99.2
16.5
Installation plate
Indoor unit external dimensions line
Left piping hole
Right piping hole
254.2
70
150
125
99

CU-2V14BK



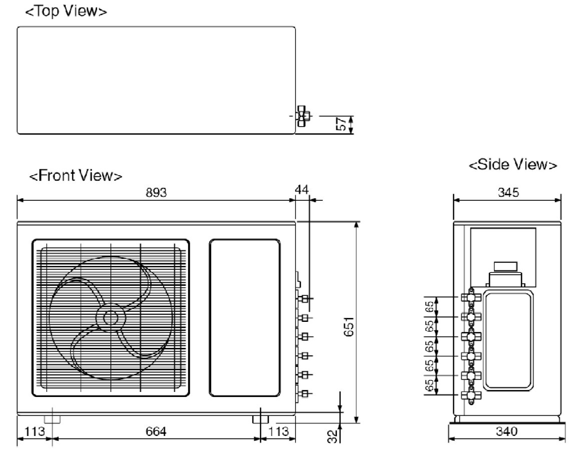
<Top View>
<Side View>
250
<Front View>
540
55
65
55
90
115
530
115
760
286

CU-2V18BK & CU-2V19BK



<Top View>
57
<Front View>
893
44
651
113
664
113
32
<Side View>
345
65
65
65
340

CU-3V20BK

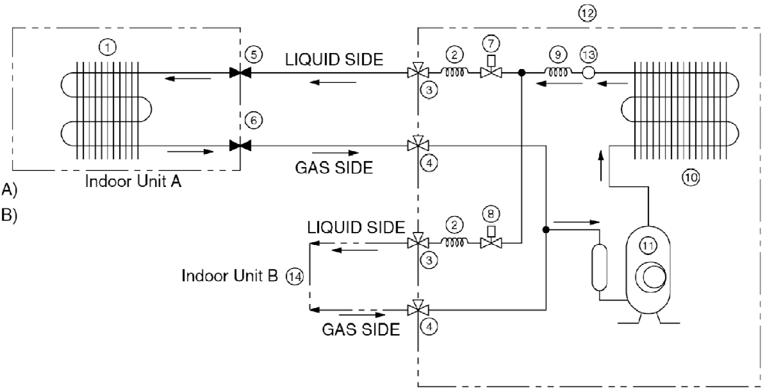


<Top View>
57
<Side View>
<Front View>
893
44
345
651
65
65
65
65
65
113
664
113
32
340

5. Refrigeration Cycle Diagram

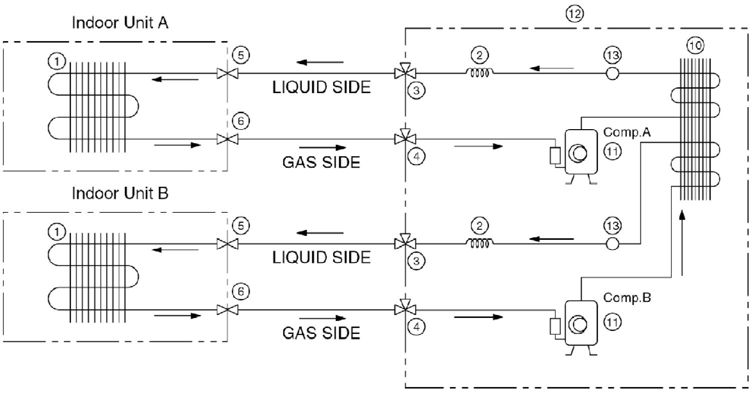
CS-V9BK / CU-2V14BK

① Evaporator
② Capillary tube (2)
③ 2 way valve (1/4")
④ 3 way valve (3/8")
⑤ Half union (1/4")
⑥ Half union (3/8")
⑦ Switching solenoid valve (A)
⑧ Switching solenoid valve (B)
⑨ Capillary tube (1)
⑩ Condensor
⑪ Compressor
⑫ Outdoor unit
⑬ Strainer
⑭ To indoor unit B


⑫
①
⑤
LIQUID SIDE
②
⑦
⑨
⑬
③
⑥
GAS SIDE
④
Indoor Unit A
⑩
LIQUID SIDE
②
⑧
③
⑪
Indoor Unit B ⑭
GAS SIDE
④

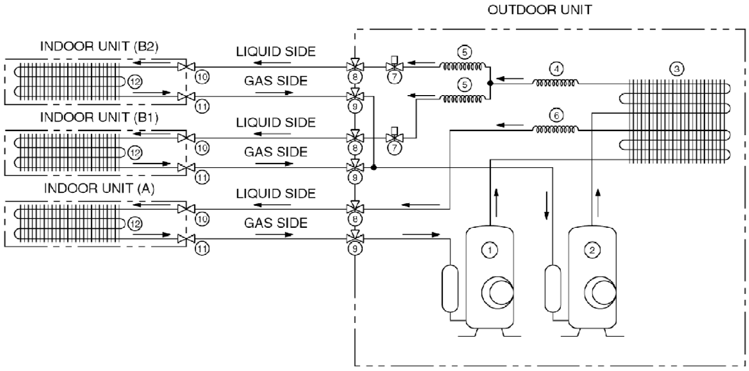
CS-V9BK / CU-2V18BK

① Evaporator
② Capillary tube (2)
③ 2 way valve (1/4")
④ 3 way valve (3/8")
⑤ Half union (1/4")
⑥ Half union (3/8")
⑩ Condensor
⑪ Compressor
⑫ Outdoor unit
⑬ Strainer


Indoor Unit A
⑫
①
⑤
②
⑬
⑩
LIQUID SIDE
③
⑥
Comp.A
GAS SIDE
④
⑪
Indoor Unit B
①
⑤
②
⑬
LIQUID SIDE
③
⑥
Comp.B
GAS SIDE
④
⑪

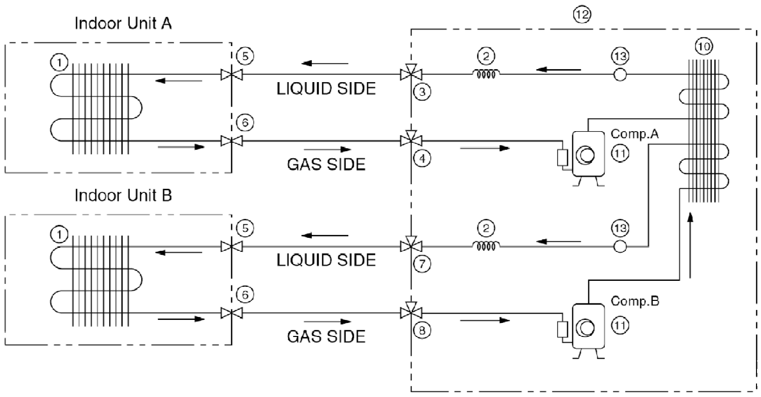
CS-V9BK / CU-3V20BK

① Compressor (1)
② Compressor (2)
③ Condensor
④ Capillary tube (1)
⑤ Capillary tube (2)
⑥ Capillary tube (3)
⑦ Switching solenoid valve
⑧ 2 way valve (1/4")
⑨ 3 way valve (3/8")
⑩ Half union (1/4")
⑪ Half union (3/8")
⑫ Evaporator


OUTDOOR UNIT
INDOOR UNIT (B2)
LIQUID SIDE
GAS SIDE
INDOOR UNIT (B1)
LIQUID SIDE
GAS SIDE
INDOOR UNIT (A)
LIQUID SIDE
GAS SIDE
⑫
⑩
⑪
⑧
⑨
⑦
⑤
④
③
⑥
①
②

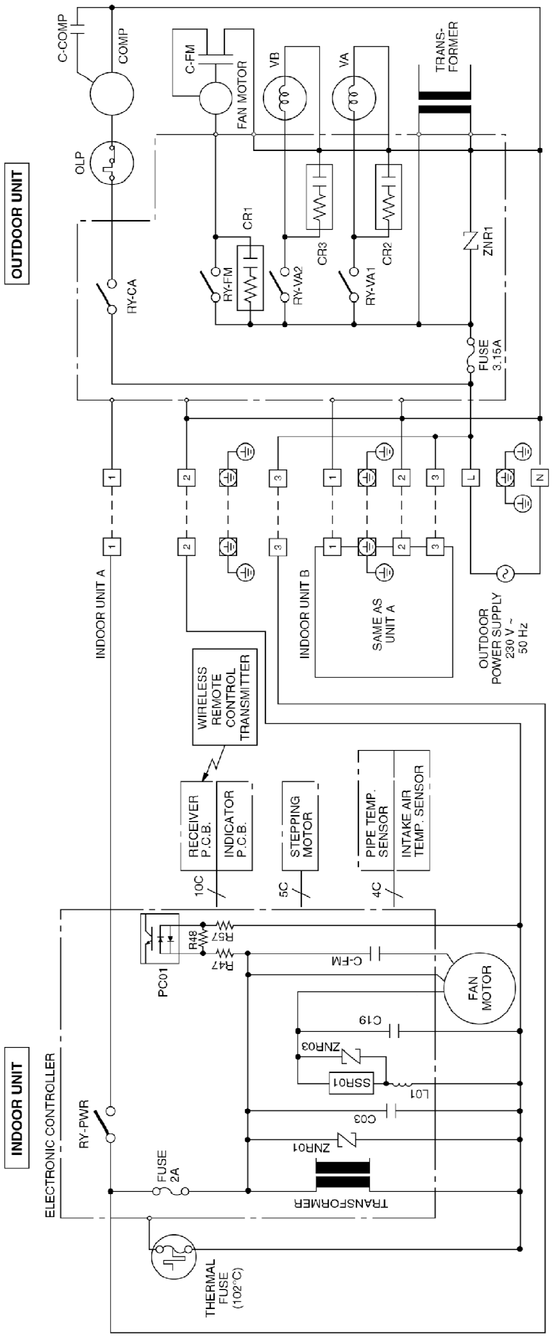
CS-V7BK, CS-V12BK / CU-2V19BK

- ① Evaporator
- ② Capillary tube (2)
- ③ 2 way valve (1/4")
- ④ 3 way valve (1/2")
- ⑤ Half union
- ⑥ Half union
- ⑦ 2 way valve (1/4")
- ⑧ 3 way valve (3/8")
- ⑩ Condensor
- ⑪ Compressor
- ⑫ Outdoor unit
- ⑬ Strainer


⑫
Indoor Unit A
①
⑤
LIQUID SIDE
③
②
⑬
⑩
⑥
GAS SIDE
④
Comp.A
⑪
Indoor Unit B
①
⑤
LIQUID SIDE
⑦
②
⑬
⑥
GAS SIDE
⑧
Comp.B
⑪

6. Block Diagram

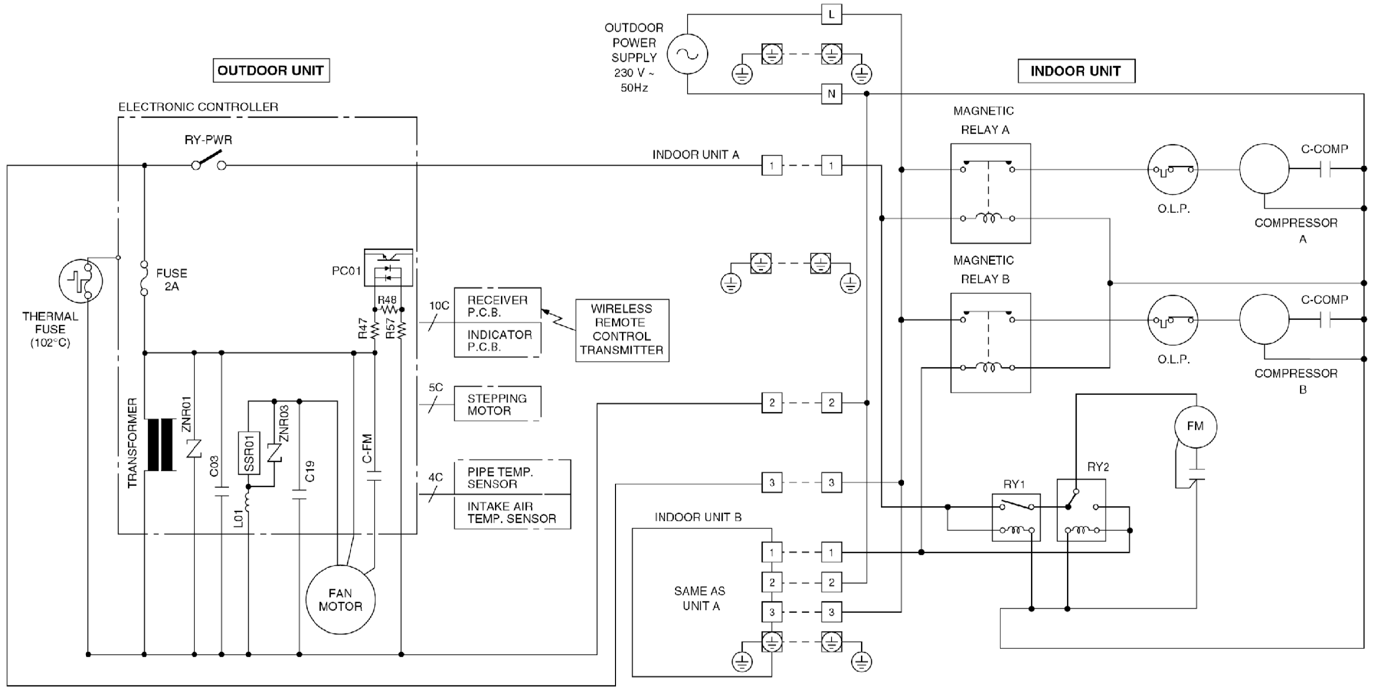
CS-V9BK / CU-2V14BK


OUTDOOR UNIT
C-COMP
COMP
OLP
RY-CA
C-FM
FAN MOTOR
CR1
RY-FM
VB
CR3
RY-VA2
VA
CR2
RY-VA1
TRANS-FORMER
ZNR1
FUSE 3.15A
1
2
3
L
N
INDOOR UNIT A
INDOOR UNIT B
SAME AS UNIT A
OUTDOOR POWER SUPPLY 230 V ~ 50 Hz
WIRELESS REMOTE CONTROL TRANSMITTER
RECEIVER P.C.B.
INDICATOR P.C.B.
10C
STEPPING MOTOR
5C
PIPE TEMP. SENSOR
INTAKE AIR TEMP. SENSOR
4C
INDOOR UNIT
ELECTRONIC CONTROLLER
RY-PWR
FUSE 2A
PC01
R48
R57
R47
C-FM
FAN MOTOR
C19
ZNR03
SSR01
L01
C03
ZNR01
TRANSFORMER
THERMAL FUSE (102°C)

※ ⌐ ¬ Indicates the electronic control unit.

※ "C" Indicates the number of core wires. (Example: 6C=6 core wires)

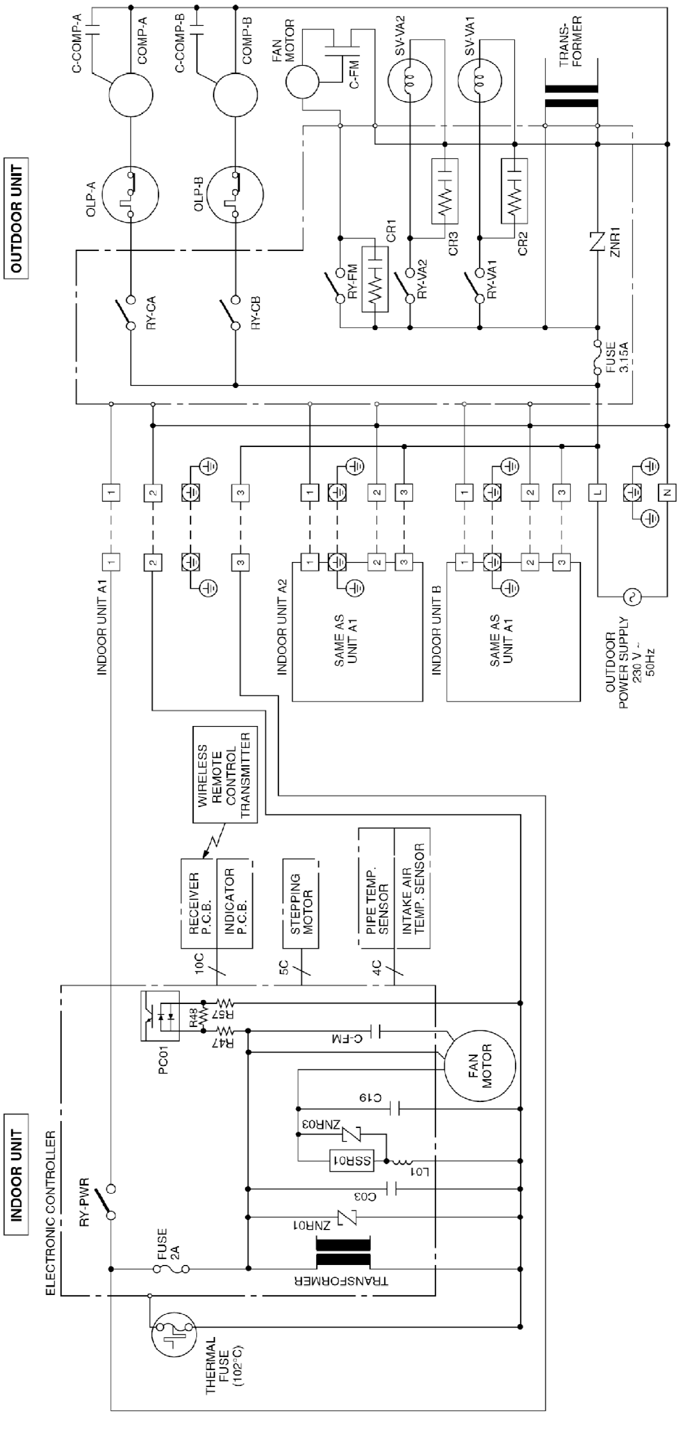
CS-V9BK / CU-2V18BK


OUTDOOR UNIT
ELECTRONIC CONTROLLER
RY-PWR
THERMAL FUSE (102°C)
FUSE 2A
PC01
R48
R47
R57
TRANSFORMER
ZNR01
C03
L01
SSR01
ZNR03
C19
C-FM
FAN MOTOR
10C
RECEIVER P.C.B.
INDICATOR P.C.B.
WIRELESS REMOTE CONTROL TRANSMITTER
5C
STEPPING MOTOR
4C
PIPE TEMP. SENSOR
INTAKE AIR TEMP. SENSOR
OUTDOOR POWER SUPPLY 230 V ~ 50Hz
L
N
INDOOR UNIT A
1
2
3
INDOOR UNIT B
SAME AS UNIT A
INDOOR UNIT
MAGNETIC RELAY A
MAGNETIC RELAY B
O.L.P.
C-COMP
COMPRESSOR A
COMPRESSOR B
FM
RY1
RY2

※ [ ] Indicates the electronic control unit.

※ "C" Indicates the number of core wires. (Example: 6C=6 core wires)

CS-V9BK / CU-3V20BK

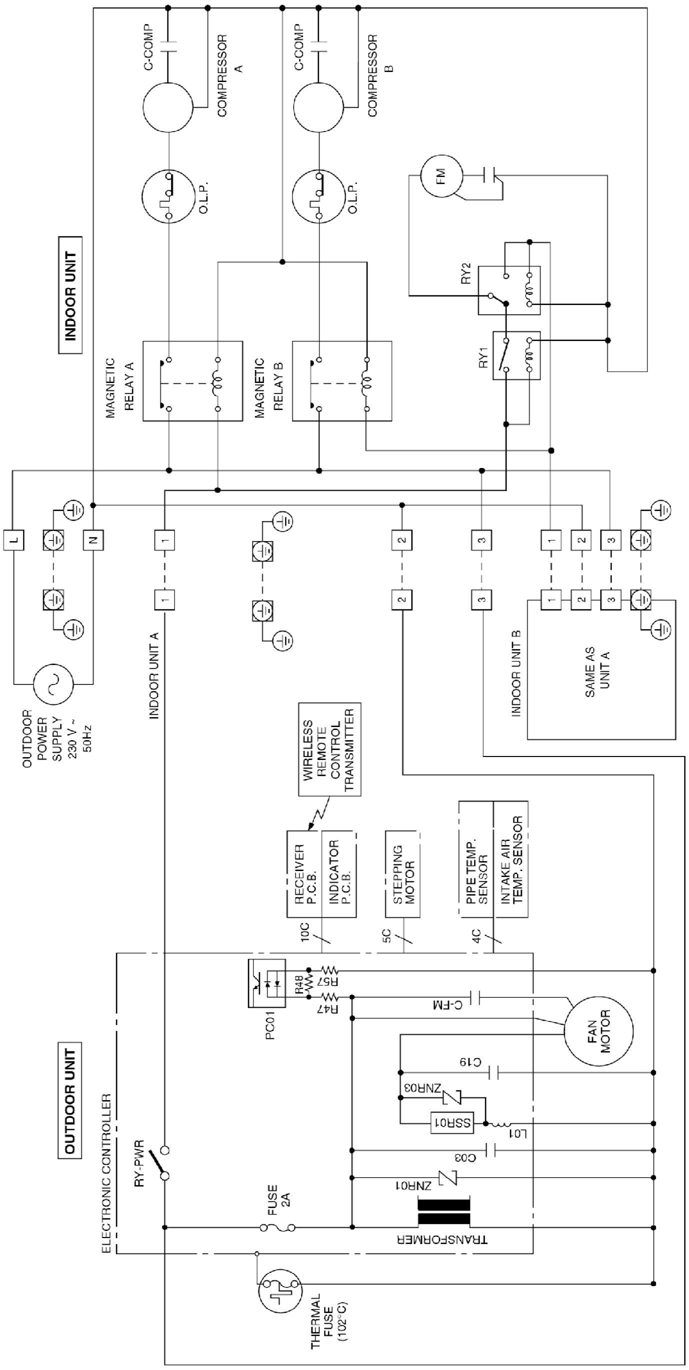

OUTDOOR UNIT
C-COMP-A
COMP-A
C-COMP-B
COMP-B
FAN MOTOR
C-FM
SV-VA2
SV-VA1
TRANS-FORMER
OLP-A
OLP-B
RY-CA
RY-CB
RY-FM
CR1
RY-VA2
CR3
RY-VA1
CR2
ZNR1
FUSE 3.15A
1
2
3
L
N
INDOOR UNIT A1
INDOOR UNIT A2
SAME AS UNIT A1
INDOOR UNIT B
SAME AS UNIT A1
OUTDOOR POWER SUPPLY 230 V ~ 50Hz
WIRELESS REMOTE CONTROL TRANSMITTER
RECEIVER P.C.B.
INDICATOR P.C.B.
STEPPING MOTOR
PIPE TEMP. SENSOR
INTAKE AIR TEMP. SENSOR
10C
5C
4C
INDOOR UNIT
ELECTRONIC CONTROLLER
RY-PWR
FUSE 2A
PC01
R48
R57
R47
C-FM
FAN MOTOR
C19
ZNR03
SSR01
L01
C03
ZNR01
TRANSFORMER
THERMAL FUSE (102°C)

※ [ ] Indicates the electronic control unit.

※ "C" Indicates the number of core wires. (Example: 6C=6 core wires)

7. Wiring Diagram

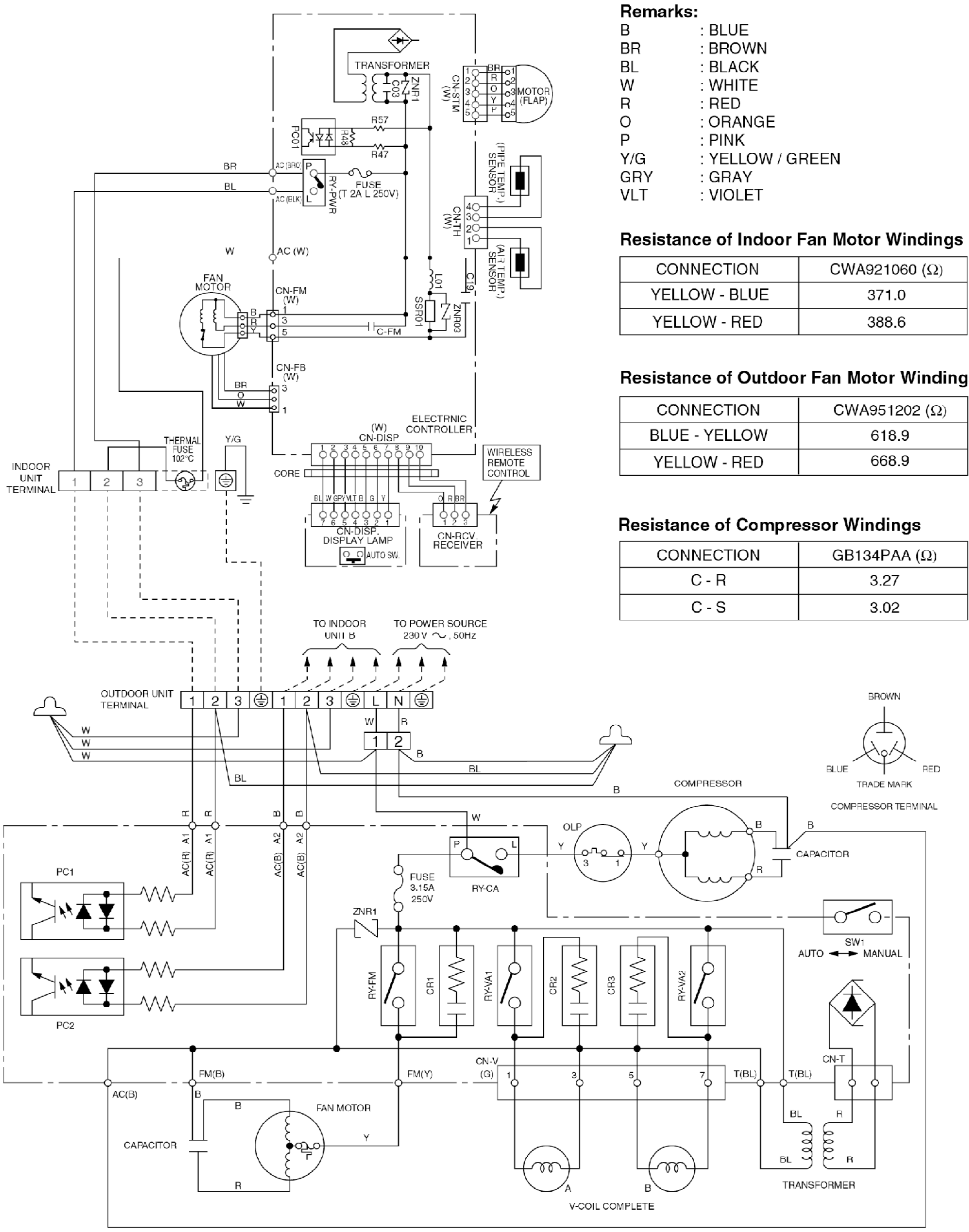
CS-V7BK, CS-V12BK / CU-2V19BK


INDOOR UNIT
C-COMP
COMPRESSOR A
C-COMP
COMPRESSOR B
O.L.P.
O.L.P.
FM
RY2
RY1
MAGNETIC RELAY A
MAGNETIC RELAY B
L
N
1
2
3
1
2
3
1
2
3
1
2
3
INDOOR UNIT A
INDOOR UNIT B
SAME AS UNIT A
OUTDOOR POWER SUPPLY 230 V ~ 50Hz
WIRELESS REMOTE CONTROL TRANSMITTER
RECEIVER P.C.B.
INDICATOR P.C.B.
STEPPING MOTOR
PIPE TEMP. SENSOR
INTAKE AIR TEMP. SENSOR
10C
5C
4C
OUTDOOR UNIT
ELECTRONIC CONTROLLER
RY-PWR
PC01
R48
R57
R47
C-FM
FAN MOTOR
C19
ZNR03
SSR01
L01
C03
ZNR01
FUSE 2A
TRANSFORMER
THERMAL FUSE (102°C)

※ [ ] Indicates the electronic control unit.

※ "C" Indicates the number of core wires. (Example: 6C=6 core wires)

CS-V9BK / CU-2V14BK


TRANSFORMER
C03
ZNR1
CN-STM
(W)
BR
R
O
Y
P
MOTOR
(FLAP)
PC01
R48
R57
R47
BR
BL
AC (BRO)
AC (BLK)
P
L
RY-PWR
FUSE
(T 2A L 250V)
(PIPE TEMP.)
SENSOR
CN-TH
(W)
(AIR TEMP.)
SENSOR
W
AC (W)
FAN
MOTOR
CN-FM
(W)
B
R
Y
L01
C19
SSR01
ZNR03
C-FM
CN-FB
(W)
BR
O
W
ELECTRNIC
CONTROLLER
(W)
CN-DISP
WIRELESS
REMOTE
CONTROL
CORE
THERMAL
FUSE
102°C
Y/G
INDOOR
UNIT
TERMINAL
1
2
3
BL W GRY VLT B G Y
O R BR
CN-DISP.
DISPLAY LAMP
AUTO SW.
CN-RCV.
RECEIVER
TO INDOOR
UNIT B
TO POWER SOURCE
230V ~, 50Hz
OUTDOOR UNIT
TERMINAL
1 2 3 1 2 3 L N
W
B
W
W
W
1 2
B
BL
BL
B
COMPRESSOR
BROWN
BLUE
RED
TRADE MARK
COMPRESSOR TERMINAL
R
R
B
B
AC(R) A1
AC(R) A1
AC(B) A2
AC(B) A2
W
P
L
RY-CA
OLP
Y
Y
3
1
B
R
B
CAPACITOR
PC1
PC2
FUSE
3.15A
250V
ZNR1
RY-FM
CR1
RY-VA1
CR2
CR3
RY-VA2
SW1
AUTO ↔ MANUAL
CN-V
(G)
1
3
5
7
T(BL)
T(BL)
CN-T
FM(B)
FM(Y)
AC(B)
B
B
FAN MOTOR
Y
CAPACITOR
R
BL
R
BL
R
A
B
V-COIL COMPLETE
TRANSFORMER

Remarks:

B : BLUE
BR : BROWN
BL : BLACK
W : WHITE
R : RED
O : ORANGE
P : PINK
Y/G : YELLOW / GREEN
GRY : GRAY
VLT : VIOLET

Resistance of Indoor Fan Motor Windings

CONNECTION	CWA921060 (Ω)
YELLOW - BLUE	371.0
YELLOW - RED	388.6

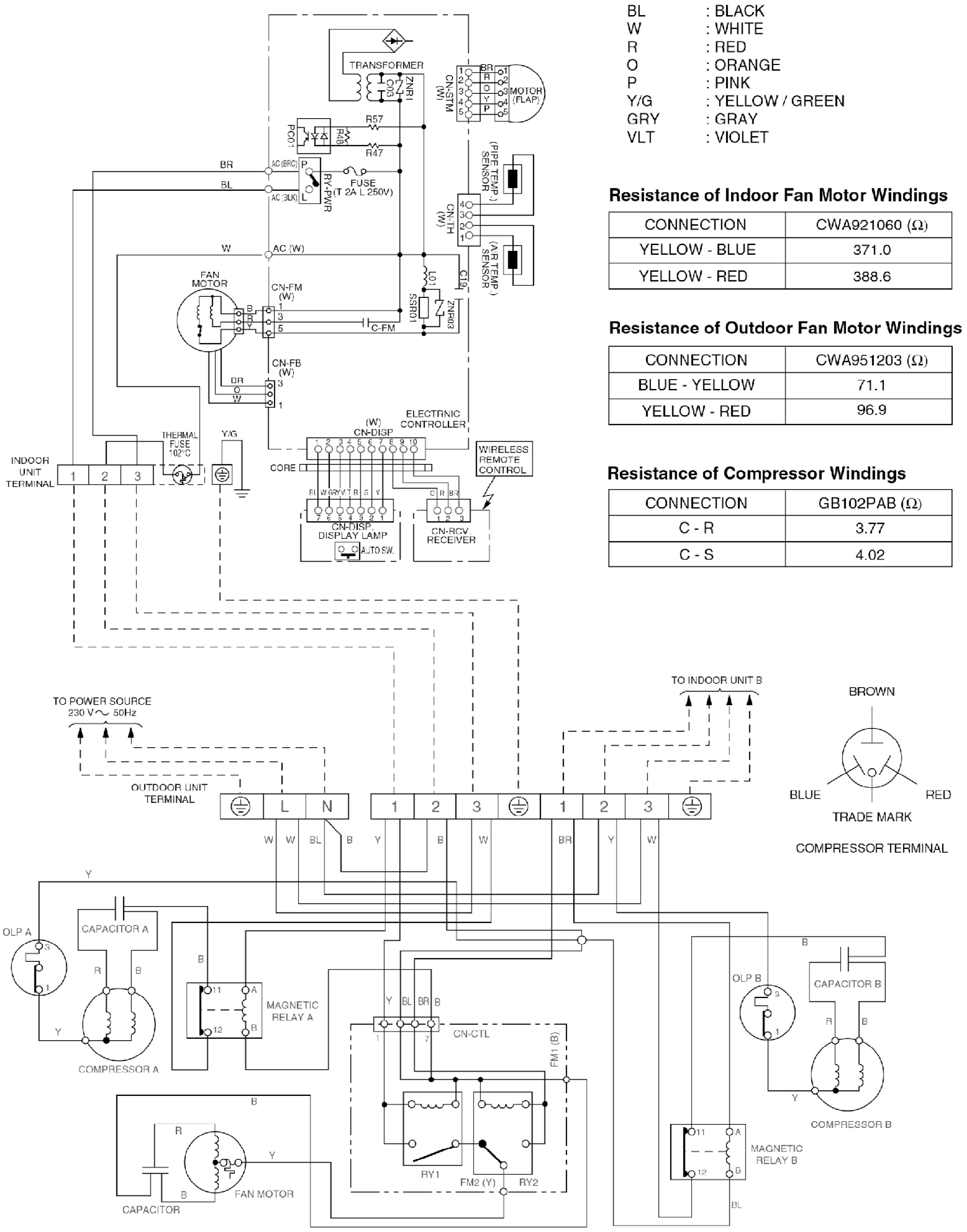
Resistance of Outdoor Fan Motor Windings

CONNECTION	CWA951202 (Ω)
BLUE - YELLOW	618.9
YELLOW - RED	668.9

Resistance of Compressor Windings

CONNECTION	GB134PAA (Ω)
C - R	3.27
C - S	3.02

CS-V9BK / CU-2V18BK


TRANSFORMER
ZNR1
C03
CN-STM (W)
MOTOR (FLAP)
R57
R48
R47
PC01
BR
BL
AC (BRC)
AC (BLK)
RY-PWR
FUSE (T 2A L 250V)
(PIPE TEMP.) SENSOR
CN-TH (W)
(AIR TEMP.) SENSOR
W
AC (W)
FAN MOTOR
CN-FM (W)
C-FM
L01
SSR01
ZNR03
C19
CN-FB (W)
ELECTRONIC CONTROLLER
(W) CN-DISP
WIRELESS REMOTE CONTROL
THERMAL FUSE 102°C
Y/G
INDOOR UNIT TERMINAL
CORE
CN-DISP DISPLAY LAMP
AUTO SW.
CN-RCV RECEIVER
TO POWER SOURCE 230 V~ 50Hz
TO INDOOR UNIT B
OUTDOOR UNIT TERMINAL
L
N
BROWN
BLUE
RED
TRADE MARK
COMPRESSOR TERMINAL
OLP A
CAPACITOR A
COMPRESSOR A
MAGNETIC RELAY A
CN-CTL
FM1 (B)
RY1
FM2 (Y)
RY2
CAPACITOR
FAN MOTOR
OLP B
CAPACITOR B
COMPRESSOR B
MAGNETIC RELAY B

Remarks:

B : BLUE
BR : BROWN
BL : BLACK
W : WHITE
R : RED
O : ORANGE
P : PINK
Y/G : YELLOW / GREEN
GRY : GRAY
VLT : VIOLET

Resistance of Indoor Fan Motor Windings

CONNECTION	CWA921060 (Ω)
YELLOW - BLUE	371.0
YELLOW - RED	388.6

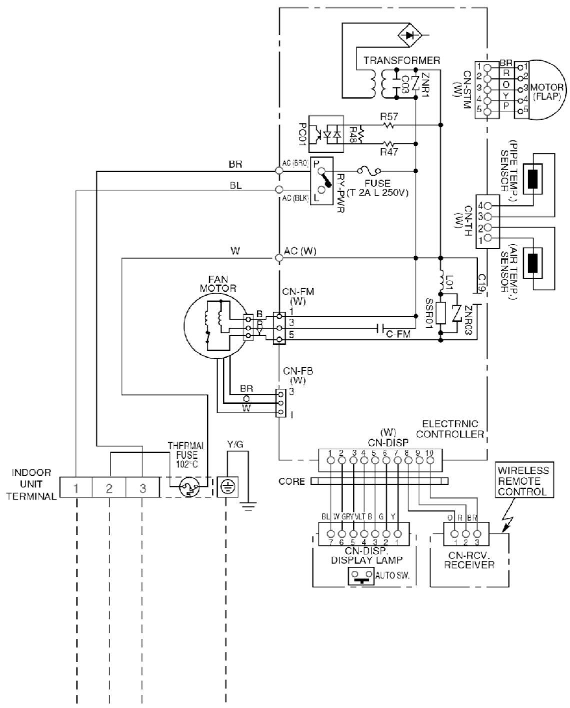
Resistance of Outdoor Fan Motor Windings

CONNECTION	CWA951203 (Ω)
BLUE - YELLOW	71.1
YELLOW - RED	96.9

Resistance of Compressor Windings

CONNECTION	GB102PAB (Ω)
C - R	3.77
C - S	4.02

CS-V9BK / CU-3V20BK


TRANSFORMER
ZNR1
C03
CN-STM (W)
MOTOR (FLAP)
BR R O Y P
R57
R48
R47
PC01
BR
BL
AC (BR)
AC (BLK)
RY-PWR
FUSE (T 2A L 250V)
(PIPE TEMP.) SENSOR
CN-TH (W)
(AIR TEMP.) SENSOR
W
AC (W)
FAN MOTOR
CN-FM (W)
L01
SSR01
ZNR03
C19
C-FM
CN-FB (W)
ELECTRONIC CONTROLLER
(W) CN-DISP
THERMAL FUSE 102°C
Y/G
INDOOR UNIT TERMINAL
1 2 3
CORE
WIRELESS REMOTE CONTROL
CN-DISP. DISPLAY LAMP
AUTO SW.
CN-RCV. RECEIVER

Remarks:

B	: BLUE
BR	: BROWN
BL	: BLACK
W	: WHITE
R	: RED
O	: ORANGE
P	: PINK
Y/G	: YELLOW / GREEN
GRY	: GRAY
VLT	: VIOLET

Resistance of Indoor Fan Motor Windings

CONNECTION	CWA921060 (Ω)
YELLOW - BLUE	371.0
YELLOW - RED	388.6

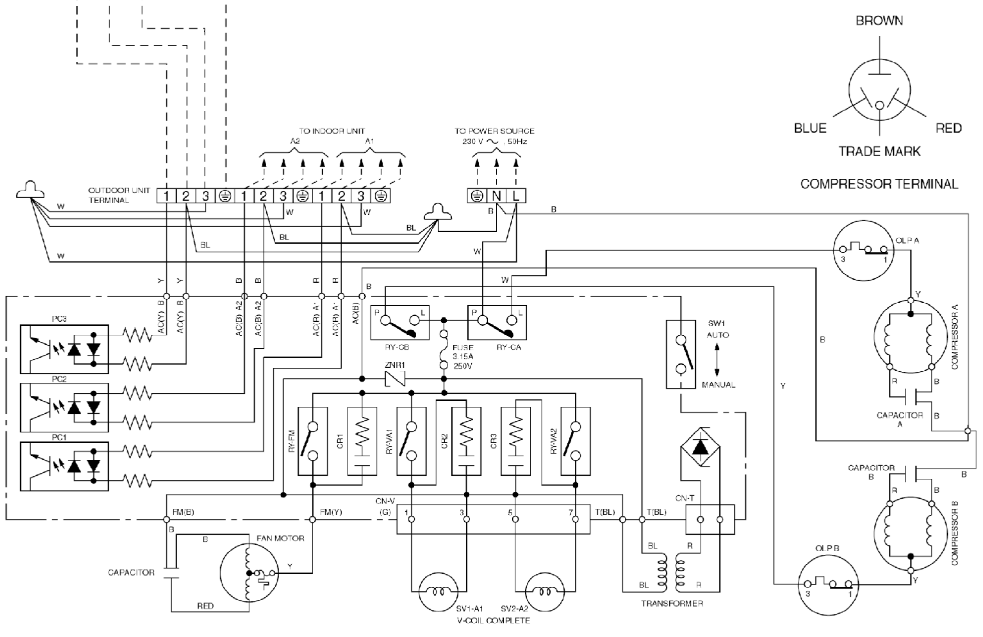
Resistance of Outdoor Fan Motor Windings

CONNECTION	CWA951203 (Ω)
BLUE - YELLOW	71.1
YELLOW - RED	96.9

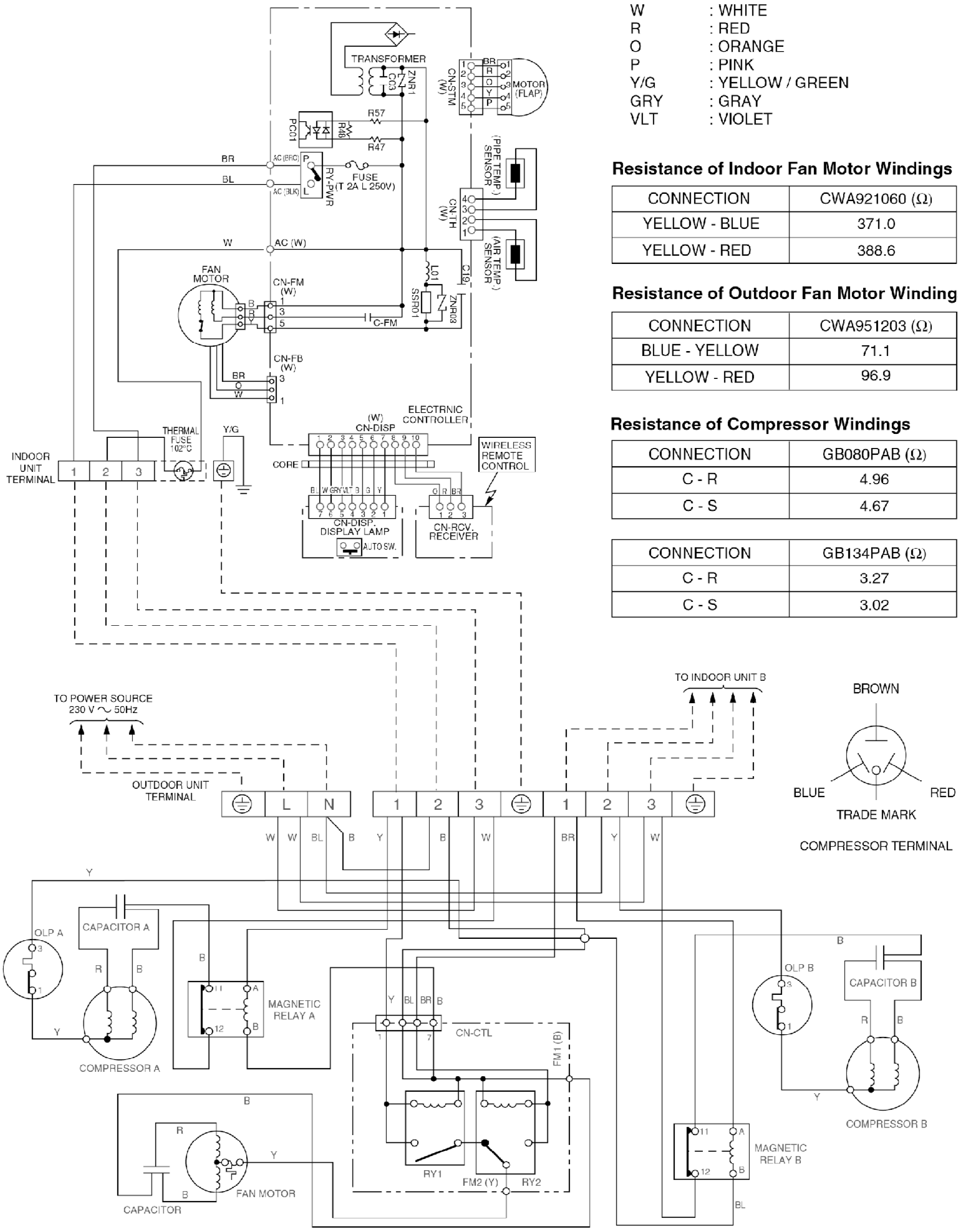
Resistance of Compressor Windings

CONNECTION	GB102PAB (Ω)
C - R	3.77
C - S	4.02

CONNECTION	GB134PAB (Ω)
C - R	3.27
C - S	3.02


BROWN
BLUE
RED
TRADE MARK
COMPRESSOR TERMINAL
TO INDOOR UNIT
A2
A1
TO POWER SOURCE 230 V ~ 50Hz
OUTDOOR UNIT TERMINAL
1 2 3 1 2 3 1 2 3
N L
OLP A
COMPRESSOR A
CAPACITOR A
CAPACITOR B
COMPRESSOR B
OLP B
PC3
PC2
PC1
RY-CB
RY-CA
FUSE 3.15A 250V
ZNR1
SW1 AUTO MANUAL
RY-FM
CR1
RY-VA1
CR2
CR3
RY-VA2
CN-V
CN-T
FM(B)
FM(Y)
T(BL)
CAPACITOR
FAN MOTOR
RED
SV1-A1
SV2-A2
V-COIL COMPLETE
TRANSFORMER

CS-V7BK, CS-V12BK / CU-2V19BK


TRANSFORMER
ZNR1
C03
CN-STM (W)
MOTOR (FLAP)
PC01
R46
R57
R47
AC (BR)
AC (BLK)
RY-PWR
FUSE (T 2A L 250V)
(PIPE TEMP.) SENSOR
CN-TH (W)
(AIR TEMP.) SENSOR
AC (W)
FAN MOTOR
CN-FM (W)
L01
SSR01
ZNR03
C19
C-FM
CN-FB (W)
ELECTRNIC CONTROLLER
CN-DISP (W)
INDOOR UNIT TERMINAL
THERMAL FUSE 102°C
Y/G
CORE
WIRELESS REMOTE CONTROL
CN-DISP. DISPLAY LAMP
AUTO SW.
CN-RCV. RECEIVER
TO POWER SOURCE 230 V ~ 50Hz
OUTDOOR UNIT TERMINAL
TO INDOOR UNIT B
L
N
OLP A
CAPACITOR A
COMPRESSOR A
MAGNETIC RELAY A
CN-CTL
FM1 (B)
RY1
FM2 (Y)
RY2
CAPACITOR
FAN MOTOR
OLP B
CAPACITOR B
COMPRESSOR B
MAGNETIC RELAY B
BROWN
BLUE
RED
TRADE MARK
COMPRESSOR TERMINAL

Remarks:

B	: BLUE
BR	: BROWN
BL	: BLACK
W	: WHITE
R	: RED
O	: ORANGE
P	: PINK
Y/G	: YELLOW / GREEN
GRY	: GRAY
VLT	: VIOLET

Resistance of Indoor Fan Motor Windings

CONNECTION	CWA921060 (Ω)
YELLOW - BLUE	371.0
YELLOW - RED	388.6

Resistance of Outdoor Fan Motor Windings

CONNECTION	CWA951203 (Ω)
BLUE - YELLOW	71.1
YELLOW - RED	96.9

Resistance of Compressor Windings

CONNECTION	GB080PAB (Ω)
C - R	4.96
C - S	4.67

CONNECTION	GB134PAB (Ω)
C - R	3.27
C - S	3.02

8. Operation Details

8.1. Cooling Mode Operation

Cooling in operation according to Remote Control setting.

Time Delay Safety Control (3 minutes)

- When the compressor is stopped by Remote Control, it restarts after 3 minutes when the Remote Control is turned ON.
- When the setting temperature is reached during cooling operation, the compressor stops and it will not start for 3 minutes.

7 minutes Time Save Control

- The compressor will start automatically if it has stopped for 7 minutes even if the room temperature is between the compressor ON temperature and OFF temperature.

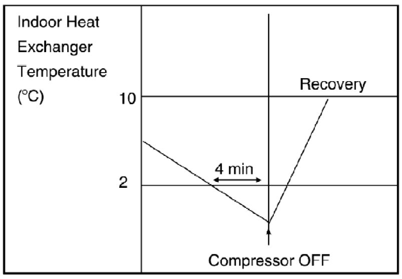
Starting Current Control

- When the compressor outdoor fan motor and indoor fan motor are simultaneously started, the indoor fan motor will operate 1.6 second later.

Anti-Freezing Control

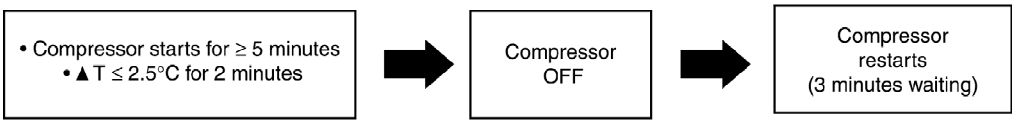
- If the temperature of the indoor heat exchanger falls continuously below 2°C for 4 minutes or more, the compressor turns off to protect the indoor heat exchanger from freezing. The fan speed setting remains the same.
- Compressor will restart again when the indoor heat exchanger temperature rises to 10°C (Recovery).

※ 3 minutes waiting of Time Delay Safety Control
is valid for Cooling Operation.



Compressor Reverse Rotation Protection Control

- If the compressor is operating continuously for 5 minutes or longer and the temperature difference between intake air and indoor heat exchanger is 2.5°C or less for 2 minutes, compressor will stop and restart automatically. / (Time Delay Safety Control is valid)


• Compressor starts for ≥ 5 minutes
• ▲T ≤ 2.5°C for 2 minutes
Compressor OFF
Compressor restarts (3 minutes waiting)

▲ T = Intake air temperature - Indoor heat exchanger temperature / This is to protect reverse rotation of the compressor when there is a instantaneous power failure.

Anti-Dew Formation Control

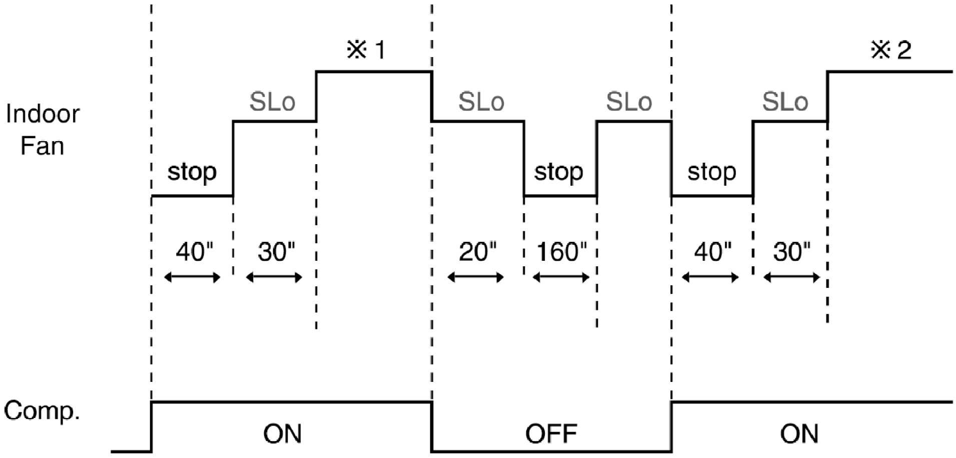
- Purpose is to prevent dew formation on indoor unit air discharge area.
- When the following conditions accur for 30 minutes continuously, anti-dew formation is controlled by indoor fan speed shift to low (CLo to HLo):
- Indoor intake air temperature is more than 24°C and less than 30°C.
- Remote Control setting temperature is less than 25°C.
- Compressor is on.
- Cooling operation mode.
- Indoor Fan motor operate at Low fan speed.
- This control is cancelled immediately when above condition is changed.

Automatic Fan Speed Mode

When Automatic Fan Speed is selected at Remote Control during cooling operation.

- Fan speed rotates in the range of Hi to Me.

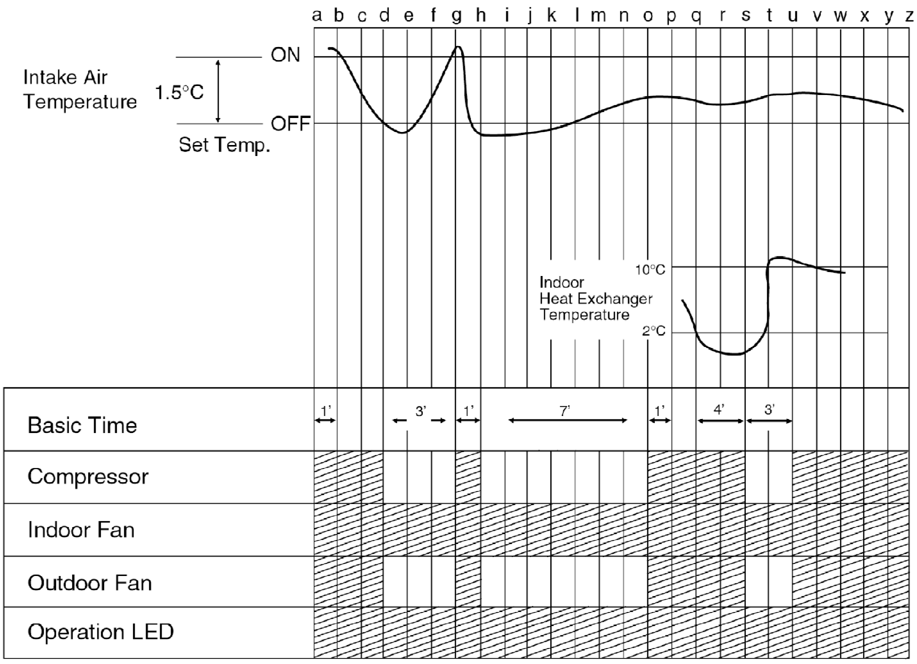
- Deodorizing Control.


※1
※2
Indoor Fan
stop
SLo
SLo
SLo
stop
stop
SLo
40"
30"
20"
160"
40"
30"
Comp.
ON
OFF
ON

※ 1 Fan Speed is Hi until the compressor stops (when the room temperature reaches setting temperature).

※ 2 Fan Speed is Me after the compressor restarts.

Cooling Operation Time Diagram


a b c d e f g h i j k l m n o p q r s t u v w x y z
Intake Air Temperature
1.5°C
ON
OFF
Set Temp.
Indoor Heat Exchanger Temperature
10°C
2°C
Basic Time
1'
3'
1'
7'
1'
4'
3'
Compressor
Indoor Fan
Outdoor Fan
Operation LED

<Description of operation>

d – g : Time Delay Safety Control (waiting for 3 minutes)
g – h : 60 sec. Forced Operation
h – o : 7 min. Time Save Control
q – u : Anti Freezing Control

▨ Operation
☐ Stop

8.2. Soft Dry Mode Operation

- The unit starts cooling operation until the room temperature

reaches the setting temperature set on the Remote Control, and then Soft Dry operation will start.

- During Soft Dry operation, the Indoor Fan will operate at SLo speed.
- The operation will be switched on and off for up to 10 minutes “ON” and 6 minutes “OFF”. Once Soft Dry operation is turned off, it stops for 6 minutes.

Time Delay Safety Control

- Once the compressor stops, it will not start for 3 minutes during Cooling operation.

Starting Current Control

- Same as Starting Current Control for Cooling Mode operation.

Anti-Freezing Control

- Same as Anti-Freezing Control for Cooling Mode operation. (For Soft Dry region, 6 minutes waiting is valid during compressor stops.)

Compressor Reverse Rotation Protection Control

- Same as Compressor Reverse Rotation Protection Control for Cooling Mode Operation. (For Soft Dry region, 6 minutes waiting is valid during compressor stops.)

Anti-Dew Formation Control

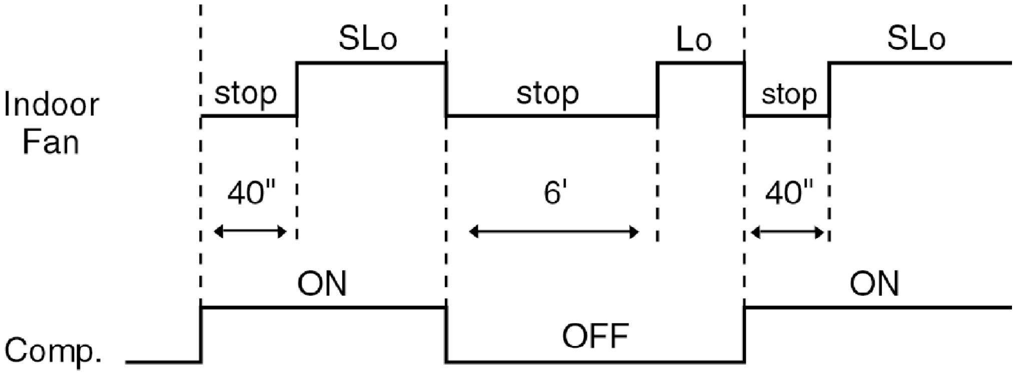
- Same as Anti-Dew Formation Control for Cooling Mode operation.

Automatic Fan Speed Mode

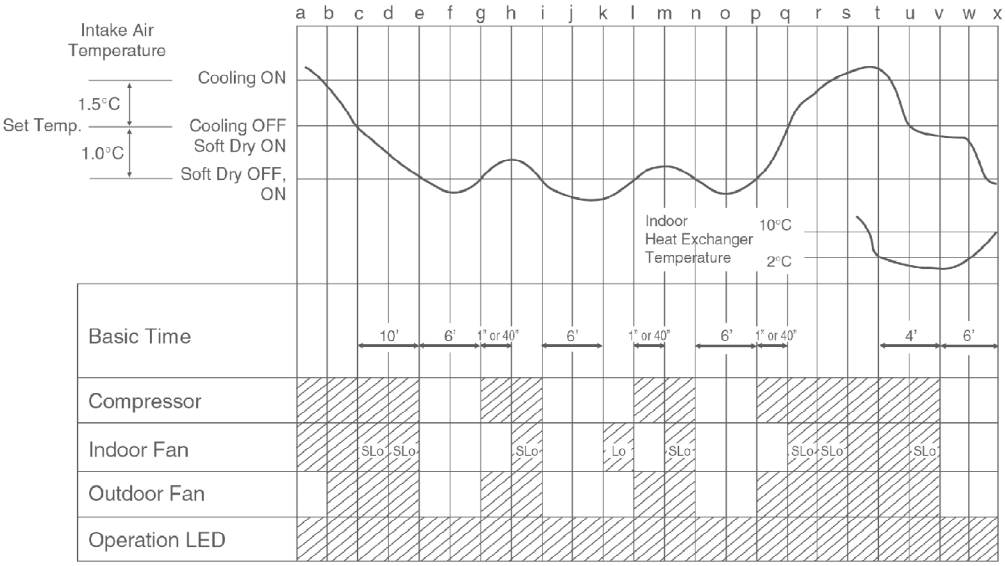
When Automatic Fan Speed is selected at Remote Control during Soft Dry operation.

- Fan speed off and on at SLo speed.

- Deodorizing Control.


Indoor Fan
stop
SLo
stop
Lo
stop
SLo
40"
6'
40"
ON
OFF
ON
Comp.

Soft Dry Operation Time Diagram


a b c d e f g h i j k l m n o p q r s t u v w x
Intake Air Temperature
Cooling ON
1.5°C
Set Temp.
Cooling OFF Soft Dry ON
1.0°C
Soft Dry OFF, ON
Indoor Heat Exchanger Temperature
10°C
2°C
Basic Time
10'
6'
1" or 40"
6'
1" or 40"
6'
1" or 40"
4'
6'
Compressor
Indoor Fan
SLo
SLo
SLo
Lo
SLo
SLo
SLo
SLo
Outdoor Fan
Operation LED

<Description of operation>

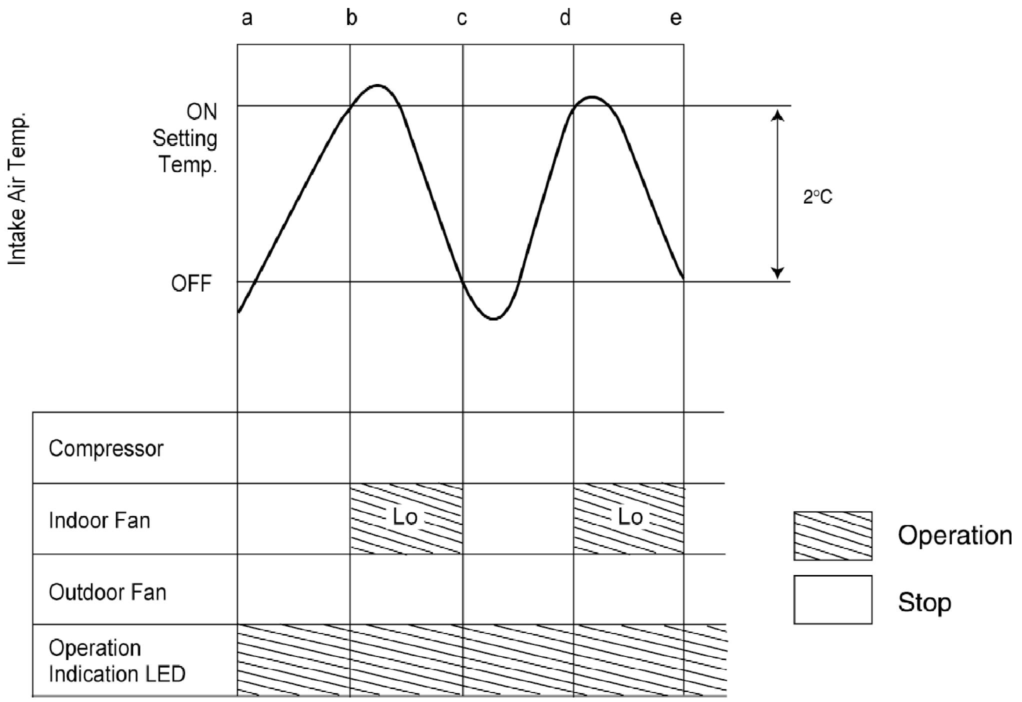
a – c : Cooling Operation
c – s : Soft Dry Operation
e – g : Soft Dry OFF
l – m : 60 sec. Forced Operation
t – x : Anti Freezing Control

▨ Operation
☐ Stop

8.3. Air Circulation Mode Operation

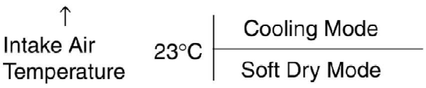
- When the temperature near the ceiling reaches the setting temperature, Air Circulation Mode operation commences at low airflow volume. It stops when the temperature drops to 2°C below the setting temperature. /

Air Circulation Mode Operation Time Diagram


a
b
c
d
e
Intake Air Temp.
ON
Setting Temp.
OFF
2°C
Compressor
Indoor Fan
Lo
Lo
Outdoor Fan
Operation Indication LED
Operation
Stop

8.4. Automatic Mode Operation

Standard for Determining Operation Mode


Intake Air Temperature
23°C
Cooling Mode
Soft Dry Mode

	Setting Temperature (Standard)
Cooling Mode	25°C
Soft Dry Mode	22°C

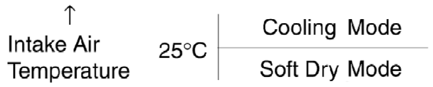
- Indoor fan operates at SLo fan speed for 25 seconds.
- After judging indoor air temperature, the operation mode is determined and operation continued at the mode determined.
- After the operation mode has been determined, the mode does not change. However, Soft Dry mode operation includes Cooling

mode operation.

- Room temperature adjustment.
The following are added to the setting temperature specified as above.

	Cooling	Soft Dry
Higher → +2°C	27°C	24°C
Standard → ±0°C	25°C	22°C
Lower → –2°C	23°C	20°C

- The mode judging temperature and standard setting temperature can be increased by 2°C, by open the circuit of JX1 at indoor electronic controller.



	Setting Temperature (Standard)
Cooling Mode	27°C
Soft Dry Mode	24°C

8.5. Sleep Mode Auto Operation

Cooling or Soft Dry Operation

Purpose is to obtain a comfortable room temperature while sleeping. When you press the SLEEP Mode, the following movement will start to avoid overcooling. /

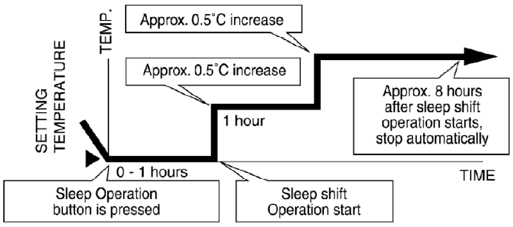
- Sleep shift operation starts, when the room temperature reaches the setting temperature or after 1 hour of operation.

- The setting temperature will be risen by 0.5°C at the start of operation and by 0.5°C one hour later.

- The airflow volume will automatically change to Lo fan speed.

- Sleep Mode operation time is 8 hours, the operation will be stop after 8 hours.

- When used together with the Timer, the Timer has priority.


TEMP.
SETTING TEMPERATURE
Approx. 0.5˚C increase
Approx. 0.5˚C increase
1 hour
Approx. 8 hours after sleep shift operation starts, stop automatically
0 - 1 hours
TIME
Sleep Operation button is pressed
Sleep shift Operation start

8.6. Powerful Mode Operation

- **Purpose of this operation is to obtain the setting temperature quickly. /**
- **When the Powerful Mode is set, the set temperature will be automatically decreased 3°C against the present setting temperature (Lower temperature: 16°C). /**
- **This operation automatically will be running under SHi Fan Speed (Cooling), SLo Fan Speed (Soft Dry). /**
- **Vertical Airflow Direction:-**
  - **In “Manual” setting, the vane will automatically swing down 10° lower than previous setting.**
  - **In “Auto” setting, the vane will automatically swing up and down. However the lower limit will be shifted 10° downward. /**
- **Powerful Mode will operate for 15 minutes only, after that it will shift back to previous operation mode. /**
- **Powerful Mode will stop if:-**
  - **Powerful mode button is pressed again.**
  - **Stopped by ON / OFF switch.**
  - **Timer OFF activates.**
  - **Economy mode button is pressed.**
  - **Sleep mode is pressed.**
  - **Operation mode button is changed.**

8.7. Economy Mode Operation

- **Purpose of this operation is to save or reduced electrical power consumption of the room air conditioner. /**
- **When the Economy Mode is set, the set temperature will be automatically increased 0.5°C against the preset setting temperature (Higher temperature: 30°C). /**
- **This operation automatically will be running under SLo Fan Speed. /**

- Vertical Airflow Direction:-
  In “Manual” or “Auto” setting, the vane will automatically change to Auto Air Swing. /
- Economy Mode will stop if:-
  - Economy Mode button is pressed again.
  - Stopped by ON / OFF switch.
  - Timer OFF activates.
  - Powerful mode button is pressed.
  - Auto or Manual air swing button is pressed.
  - Fan Speed control button is pressed.
  - Sleep Mode button is pressed ON.
  - Operation Mode is changed.

8.8. Random Auto Restart Control

- If there is a power failure, operation will be automatically restarted after 3 to 4 minutes when the power is resumed.
  It will start with previous operation mode and airflow direction. /
- Restart time is decided randomly using 4 parameter:-
  Intake air temperature, setting temperature, fan speed and Air Swing Blade position. /
- Auto Restart Control is not available when Timer or Sleep Mode is set. /
- This control can be omitted by open the circuit of JX2. (Refer Circuit Diagram) /

8.9. Indoor Fan Speed Control

- Auto Fan Speed Control
  When set to Auto Fan Speed, the fan speed is adjusted between maximum and minimum setting as shown in the table. /
- Manual Fan Speed Control
  Basic fan speed adjustment (3 settings, from Lo to Hi) can be carried out by using the Fan Speed selection button at the remote control. /

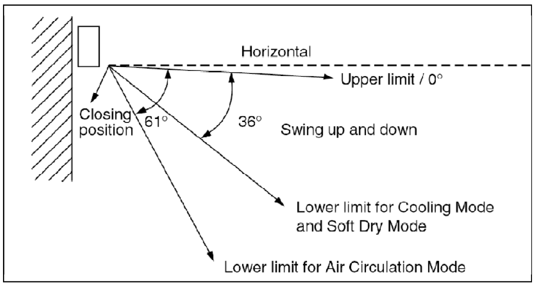
Tap				S Hi	Hi	Me	H Lo	C Lo	Lo-	S Lo	SSLo	Stop
Cooling	Normal	Manual	Hi		○							
			Me			○						
			Lo				○	○				
		Air volume auto			○	○				○		
		Sleep shift						○				
	Powerful	Manual		○								
		Air volume auto		○								
		Sleep shift						○				
	Economy	Manual								○		
		Air volume auto								○		
		Sleep shift						○				
Dry	Normal Powerful Economy	Manual, Air volume auto								○		○
		Sleep shift						○				
Air circulation		Normal						○				
Auto Mode judgement										○		

	Cooling			Soft dry (dry area)			Air circulation
	Normal	Powerful	Economy	Normal	Powerful	Economy	Normal
Normal Operation	Control by remote controller	S Hi	S Lo	S Lo	S Lo	S Lo	C Lo
Sleep mode	C Lo	C Lo	C Lo	C Lo	C Lo	C Lo	–
Preliminary operation (On timer)	Control by remote controller	–	–	S Lo	–	–	–

8.10. Vertical Airflow Direction Control

Vertical Airflow Direction Auto-Control

- **When set a Airflow Direction Auto-Control with remote control, the louver swings up and down as shown in the diagram.**
- **The louver does not swing when the Indoor Fan Motor stops during operation at the upper limit.**
- **When stopped with remote control, the discharge vent is reset, and stopped at the closing position.**


Horizontal
Upper limit / 0°
Closing position
61°
36°
Swing up and down
Lower limit for Cooling Mode and Soft Dry Mode
Lower limit for Air Circulation Mode

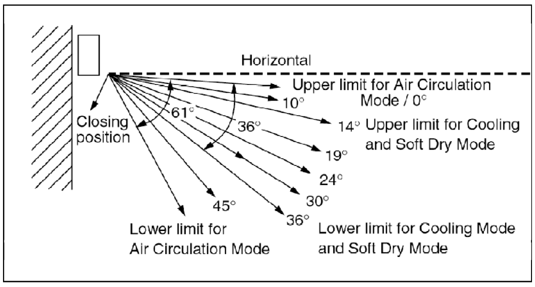
※ The left and right airflow direction louvers can be adjusted manually.

※1. There is no swinging while indoor fan motor is stopped during Cooling and Soft Dry operati

※2. In Air Circulation operation, when the intake air temperature reaches set temperature, the air
direction is changed from upper limit to lower limit. When the intake air temperature falls to
than set temperature, the airflow direction is changed from lower limit to upper limit.

Vertical Airflow Direction manual Control

- When the manual Airflow Direction Selection Button is pressed, the automatic airflow is released and the airflow direction louver move up and down in the range shown in the diagram.
  The louver can be adjusted by pressing the button to the desired louver position.
- When the remote control is used to stop the operation, the discharge vent is reset, and stopped at the closing position.


Horizontal
Upper limit for Air Circulation Mode / 0°
10°
Closing position
61°
36°
14° Upper limit for Cooling and Soft Dry Mode
19°
24°
30°
45°
36°
Lower limit for Air Circulation Mode
Lower limit for Cooling Mode and Soft Dry Mode

※ The left and right airflow direction louvers can be adjusted manually.

8.11. Delay ON Timer Control

- When the Delayed ON Timer is set by using the remote control, the unit will start operate slightly before the set time, so that the room will reach nearly to the set temperature by the desired time.
- For Cooling and Soft Dry mode, the operation will start 15 minutes before the set time.

- For Automatic mode, the indoor fan will operate at SLo speed for 25 seconds, 15 minutes before the set time to detect the intake air temperature to determine the operation mode. The operation indication lamp will blink at this time.

8.12. Remote Control Signal Receiving Sound

- Long beep sound will be heard when:-
- Stopping the Air Conditioner using ON/OFF switch.
- Stopping the Sleep Mode.
- Stopping the Powerful Mode.
- Stopping the Economy Mode.
- Short beep sound will be heard for others.
- To switch off the beep sound:-
  Press the “Automatic Operation Button” continuously for 10 seconds or more (“beep” “beep” will be heard at the 10th second).
  Repeat the above if you want to switch ON the beep sound.

※ However, if the “Automatic Operation Button” has been pressed the Automatic operation will b
activated.
If you do not require this operation, you may change it by using the remote control.

9. Operating Instructions

10. Installation Instructions

Required tools for Installation Works			
1. Philips screw driver	5. Spanner	9. Gas leak detector	13.Multimeter
2. Level gauge	6. Pipe cutter	10.Measuring tape	14.Torque wrench 18 N.m (1.8 kgf.m) 42 N.m (4.2 kgf.m) 55 N.m (5.5 kgf.m)
3. Electric drill, hole core drill (ø70 mm)	7. Reamer	11.Thermometer	15.Vacuum pump
4. Hexagonal wrench (4 mm)	8. Knife	12.Megameter	16.Gauge manifold

10.1. Safety Precautions

- Read the following “SAFETY PRECAUTIONS” carefully before installation.
- Electrical work must be installed by a licensed electrician. Be sure

to use the correct rating of the power plug and main circuit for the model to be installed.

- The caution items stated here must be followed because these important contents are related to safety. The meaning of each indication used is as below. Incorrect installation due to ignoring of the instruction will cause harm or damage, and the seriousness is classified by the following indications.

⚠ **WARNING**	**This indication shows the possibility of causing death or serious injury.**

⚠ **CAUTION**	**This indication shows the possibility of causing injury or damage to prop**

The items to be followed are classified by the symbols:

🛇	**Symbol with background white denotes item that is PROHIBITED from do**

- Carry out test running to confirm that no abnormality occurs after the installation. Then, explain to user the operation, care and maintenance as stated in instructions. Please remind the customer to keep the operating instructions for future reference.

WARNING

1. **Engage dealer or specialist for installation. If installation done by the user is defective, it will c water leakage, electrical shock or fire.**
2. **Install according to this installation instruction strictly. If installation is defective, it will cause leakage, electrical shock or fire.**
3. **Use the attached accessories parts and specified parts for installation. Otherwise, it will cause to fall, water leakage, fire or electrical shock.**
4. **Install at a strong and firm location which is able to withstand the set’s weight. If the strength i enough or installation is not properly done, the set will drop and cause injury.**
5. **For electrical work, follow the local national wiring standard, regulation and this installation instruction. An independent circuit and single outlet must be used. If electrical circuit capacity enough or defect found in electrical work, it will cause electrical shock or fire.**
6. **Use the specified cable (1.5 mm2) and connect tightly for indoor/outdoor connection. Connect and clamp the cable so that no external force will be acted on the terminal. If connection or fix perfect, it will cause heat-up or fire at the connection.**
7. **Wire routing must be properly arranged so that control board cover is fixed properly. If control cover is not fixed perfectly, it will cause heat-up at connection point of terminal, fire or electric**
8. **When carrying out piping connection, take care not to let air substances other than the specifi refrigerant go into refrigeration cycle. Otherwise, it will cause lower capacity, abnormal high p in the refrigeration cycle, explosion and injury.**
9. **When connecting the piping, do not allow air or any substances orther than the specified refrigerant (R410A) to enter the refrigeration cycle. Otherwise, this may lower the capacity, cause abnormally high pressure in the refrigeration cycle, and possibly result in explosion and injury. (V7BKPG, V9BKPG, V12BKPG)**
10. **-When connecting the piping, do not use any existing (R22) pipes and flare nuts. Using such same may cause abnormally high pressure in the refrigeration cycle (piping), and possibly result in explosion and injury. Use only R410A materials.**
    -Thickness of copper pipes used with R410A must be more than 0.8 mm. Never use copper pipes thinner than 0.8 mm.
    -It is desirable that the amount of residual oil is less than 40 mg/10 m. (V7BKPG, V9BKPG, V12BKPG)
11. **Do not modify the length of the power supply cord or use of the extension cord, and do not share the single outlet with other electrical appliances. Otherwise, it will cause fire or electrical shock.**

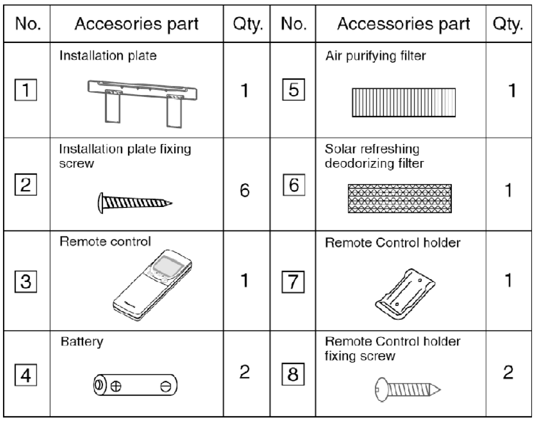
CAUTION

1. This equipment must be earthed. It may cause electrical shock if grounding is not perfect.
2. Do not install the unit at place where leakage of flammable gas may occur. In case gas leaks and accumulates at surrounding of the unit, it may cause fire.
3. Carry out drainage piping as mentioned in installation instructions. If drainage is not perfect, v enter the room and damage the furniture.

ATTENTION

1. Selection of the installation location.
   Select a installation location which is rigid and strong enough to support or hold the unit, and location for easy maintenance.
2. Power supply connection to the room air conditioner.
   Connect the power supply cord of the room air conditioner to the mains using the following m
   Power supply connection to a circuit breaker for the permanent connection. Use an approved circuit breaker for the permanent connection. It must be a double pole switch with a minimum contact gap.
3. Do not release refrigerant.
   Do not release refrigerant during piping work for installation, reinstallation and during repairin refrigeration parts. Take care of the liquid refrigerant, it may cause frostbite.
4. Installation work.
   It may need two people to carry out the installation work.
5. Do not install this appliance in a laundry room or other location where water may drip from the etc.

Attached accessories



No.	Accesories part	Qty.	No.	Accessories part	Qty.
1	Installation plate	1	5	Air purifying filter	1
2	Installation plate fixing screw	6	6	Solar refreshing deodorizing filter	1
3	Remote control	1	7	Remote Control holder	1
4	Battery	2	8	Remote Control holder fixing screw	2

Applicable piping kit
CZ-3F5, 7AEN (CS-V7BKPG, CS-V9BKPG)
CZ-4F5, 7, 10AN (CS-V12BKPG)

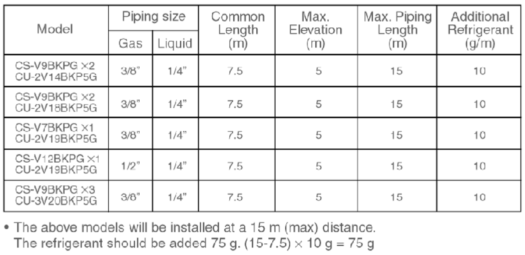
SELECT THE BEST LOCATION

INDOOR UNIT

- There should not be any heat source or steam near the unit.
- There should not be any obstacles blocking the air circulation.
- A place where air circulation in the room is good.
- A place where drainage can be easily done.
- A place where noise prevention is taken into consideration.
- Do not install the unit near the door way.
- Ensure the spaces indicated by arrows from the wall, ceiling, fence or other obstacles.
- Recommended installation height for indoor unit shall be at least 2.3 m.

OUTDOOR UNIT

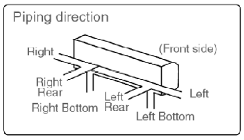
- If an awning is built over the unit to prevent direct sunlight or rain, be careful that heat radiation from the condenser is not obstructed.
- There should not be any animal or plant which could be affected by hot air discharged.
- Keep the spaces indicated by arrows from wall, ceiling, fence or other obstacles.
- Do not place any obstacles which may cause a short circuit of the discharged air.
- If piping length is over the common length, additional refrigerant should be added as shown in the table.

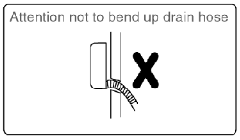


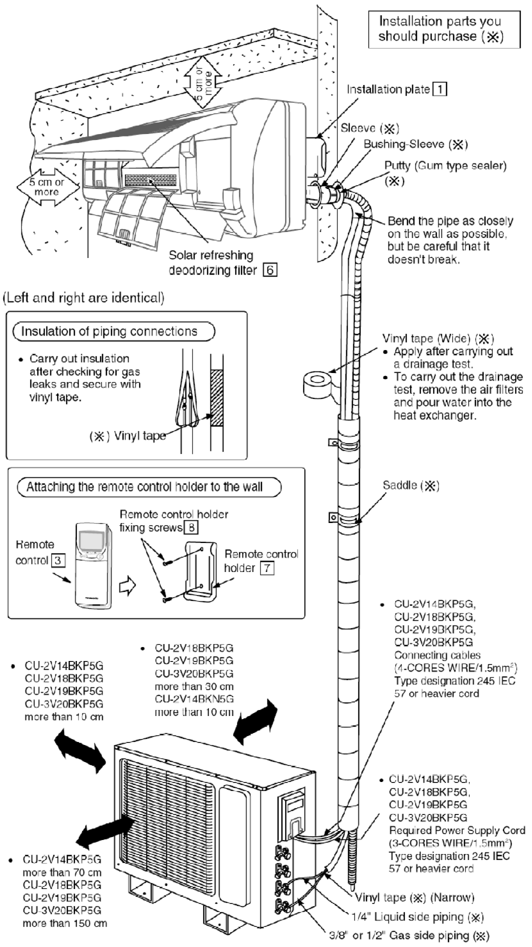
Model	Piping size		Common Length (m)	Max. Elevation (m)	Max. Piping Length (m)	Additional Refrigerant (g/m)
	Gas	Liquid				
CS-V9BKPG ×2 CU-2V14BKP5G	3/8"	1/4"	7.5	5	15	10
CS-V9BKPG ×2 CU-2V18BKP5G	3/8"	1/4"	7.5	5	15	10
CS-V7BKPG ×1 CU-2V19BKP5G	3/8"	1/4"	7.5	5	15	10
CS-V12BKPG ×1 CU-2V19BKP5G	1/2"	1/4"	7.5	5	15	10
CS-V9BKPG ×3 CU-3V20BKP5G	3/8"	1/4"	7.5	5	15	10

- The above models will be installed at a 15 m (max) distance.
  The refrigerant should be added 75 g. (15-7.5) × 10 g = 75 g

Indoor/Outdoor Unit Installation Diagram


Piping direction
Hight
(Front side)
Right
Rear
Left
Right Bottom
Left
Rear
Left Bottom


Attention not to bend up drain hose
X


Installation parts you should purchase (※)
5 cm or more
5 cm or more
Installation plate 1
Sleeve (※)
Bushing-Sleeve (※)
Putty (Gum type sealer) (※)
Bend the pipe as closely on the wall as possible, but be careful that it doesn't break.
Solar refreshing deodorizing filter 6
(Left and right are identical)
Insulation of piping connections
• Carry out insulation after checking for gas leaks and secure with vinyl tape.
(※) Vinyl tape
Vinyl tape (Wide) (※)
• Apply after carrying out a drainage test.
• To carry out the drainage test, remove the air filters and pour water into the heat exchanger.
Attaching the remote control holder to the wall
Remote control holder fixing screws 8
Remote control 3
Remote control holder 7
Saddle (※)
• CU-2V14BKP5G, CU-2V18BKP5G, CU-2V19BKP5G, CU-3V20BKP5G Connecting cables (4-CORES WIRE/1.5mm²) Type designation 245 IEC 57 or heavier cord
• CU-2V18BKP5G CU-2V19BKP5G CU-3V20BKP5G more than 30 cm CU-2V14BKN5G more than 10 cm
• CU-2V14BKP5G CU-2V18BKP5G CU-2V19BKP5G CU-3V20BKP5G more than 10 cm
• CU-2V14BKP5G, CU-2V18BKP5G, CU-2V19BKP5G CU-3V20BKP5G Required Power Supply Cord (3-CORES WIRE/1.5mm²) Type designation 245 IEC 57 or heavier cord
• CU-2V14BKP5G more than 70 cm CU-2V18BKP5G CU-2V19BKP5G CU-3V20BKP5G more than 150 cm
Vinyl tape (※) (Narrow)
1/4" Liquid side piping (※)
3/8" or 1/2" Gas side piping (※)

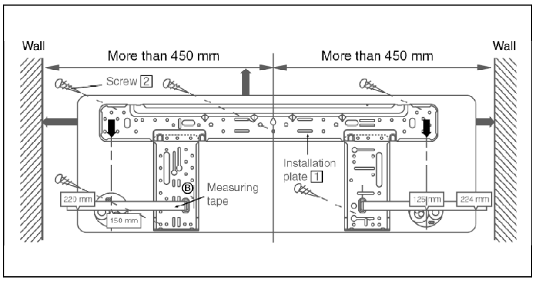
- This illustration is for explanation purpose only.
  The indoor unit will actually face a diferrent way.

10.2. INDOOR UNIT

10.2.1. SELECT THE BEST LOCATION / (Refer to “Select the best location” section)

10.2.2. HOW TO FIX INSTALLATION PLATE

The mounting wall is strong and solid enough to prevent it from the vibration.


Wall
More than 450 mm
More than 450 mm
Wall
Screw 2
Installation plate 1
Measuring tape
B
220 mm
150 mm
125 mm
224 mm

The centre of installation plate should be at more than 450 mm at right and left of the wall.

The distance from installation plate edge to ceiling should more than 67 mm.
From installation plate left edge to unit's left side is 47 mm.
From installation plate right edge to unit's right is 73 mm.

Ⓑ : **For left side piping, piping connection for**
liquid should be about 14 mm from this line.
For left side piping, piping connection for
: **gas should be about 56 mm from this line.**
For left side piping, piping connecting cable
should be about 785 mm from this line.
:

1. **Mount the installation plate on the wall with 5 screws or more. / (If mounting the unit on the concrete wall consider using anchor bolts.)**

   - **Always mount the installation plate horizontally by aligning the marking-off line with the thread and using a level gauge.**

2. **Drill the piping plate hole with ø70 mm hole-core drill.**

   - **Line according to the arrows marked on the lower left and right side of the installation plate. The meeting point of the extended line is the centre of the hole. Another method is by putting measuring tape at position as shown in the diagram above. The hole centre is obtained by measuring the distance namely 150 mm and 125 mm for left and right hole respectively.**

   - **Drill the piping hole at either the right or the left and the hole should be slightly slanted to the outdoor side.**

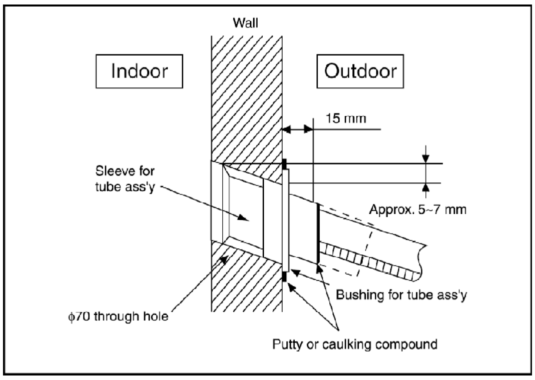
10.2.3. TO DRILL A HOLE IN THE WALL AND INSTALL A SLEEVE OF PIPING

1. **Insert the piping sleeve to the hole.**
2. **Fix the bushing to the sleeve.**
3. **Cut the sleeve until it extrudes about 15 mm from the wall.**

Caution

When the wall is hollow, please be sure to use the sleeve for tube ass'y to prevent dangers caused by mice biting the connecting cable.

4. Finish by sealing the sleeve with putty or caulking compound at the final stage.


Wall
Indoor
Outdoor
15 mm
Sleeve for tube ass'y
Approx. 5~7 mm
Bushing for tube ass'y
ϕ70 through hole
Putty or caulking compound

10.2.4. INDOOR UNIT INSTALLATION

1. For the right rear piping

Pull out the Indoor piping

Install the Indoor Unit

Secure the Indoor Unit

Insert the connecting cable

2. For the right and right bottom piping

Pull out the Indoor piping

Install the Indoor Unit

Insert the connecting cable

Secure the Indoor Unit

3. For the embedded piping

Replace the drain hose

⬇

Bend the embedded piping

⬇
- Use a spring bender or equivalent to bend the piping so that the piping is not crushed.

Install the Indoor Unit

⬇

Cut and flare the embedded piping

⬇
- When determing the dimension of the piping, slide the unit all the way to the left on the installation plate.
  Refer to the section "Cutting and flaring the piping".

Pull the connecting cable into Indoor Unit

⬇
- The inside and outside connecting cable can be connected without removing the front grille.

Connect the piping

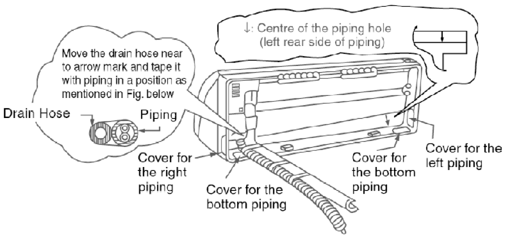
⬇
- Please refer to "Connecting the piping" column in outdoor unit section. (Below steps are done after connecting the outdoor piping and gas-leakage confirmation.)

Insulate and finish the piping

⬇
- Please refer to "Piping and finishing" column of outdoor section and "Insulation of piping connections" column as mentioned in Indoor/ Outdoor Unit Installation.

Secure the Indoor Unit

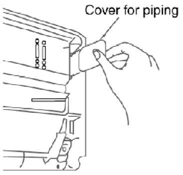
Pull out the piping and drain hose


↓: Centre of the piping hole
(left rear side of piping)
Move the drain hose near to arrow mark and tape it with piping in a position as mentioned in Fig. below
Drain Hose
Piping
Cover for the right piping
Cover for the bottom piping
Cover for the bottom piping
Cover for the left piping

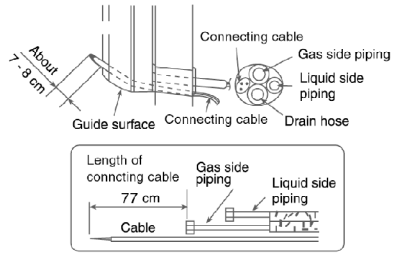
How to keep the cover

In case of the cover is cut, keep the cover at the rear of chassis as shown in the illustration for future reinstallation.

(Left, right and 2 bottom covers for piping)

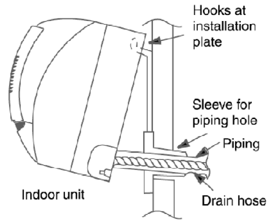

Cover for piping

Insert the connecting cable


Connecting cable
Gas side piping
Liquid side piping
About 7 - 8 cm
Guide surface
Connecting cable
Drain hose
Length of connctiing cable
Gas side piping
Liquid side piping
77 cm
Cable

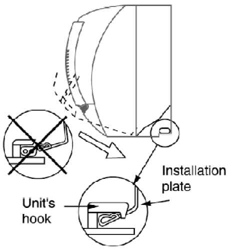
Install the Indoor Unit

Hook the indoor unit onto the upper portion of installation plate (Engage the indoor unit with the upper edge of the installation plate). Ensure the hooks are properly seated on the installation plate by moving in left and right.

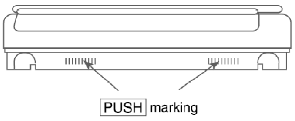

Hooks at installation plate
Sleeve for piping hole
Piping
Indoor unit
Drain hose

Secure the Indoor Unit

1. Tape the extra power supply cord in a bundle and keep it behind the chassis.
   - Ensure that the power supply cord is not clamped in between the unit's hook (2 positions) and installation plate.
2. Press the lower left and right side of the unit against the installation plate until hooks engages with their slots (sound click).


Installation plate
Unit's hook

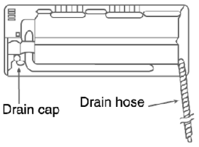
To take out the unit, push the PUSH marking at the bottom unit, and pull it slightly towards you to disengage the hooks from the unit.

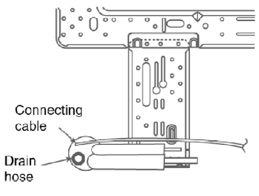

PUSH marking

(This can be used for left rear piping & left bottom piping also.)

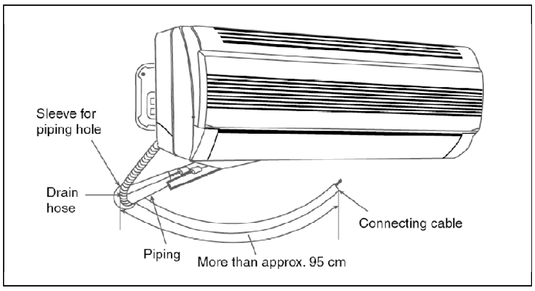
Exchange the drain hose and the cap

Refer view for left piping installation

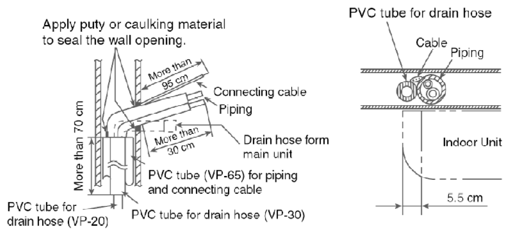

Drain cap
Drain hose


Connecting cable
Drain hose

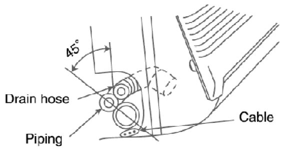
Adjust the piping slightly downwards


Sleeve for piping hole
Drain hose
Piping
More than approx. 95 cm
Connecting cable

- How to pull the piping and drain hose out, in case of the embedded piping.


Apply puty or caulking material to seal the wall opening.
More than 95 cm
Connecting cable
Piping
More than 70 cm
More than 30 cm
Drain hose form main unit
PVC tube (VP-65) for piping and connecting cable
PVC tube for drain hose (VP-20)
PVC tube for drain hose (VP-30)
PVC tube for drain hose
Cable
Piping
Indoor Unit
5.5 cm

- In case of left piping how to insert the connecting cable and drain hose.


45°
Drain hose
Piping
Cable

(For the right piping, follow the same procedure)

10.2.5. CONNECT THE CABLE TO THE INDOOR UNIT

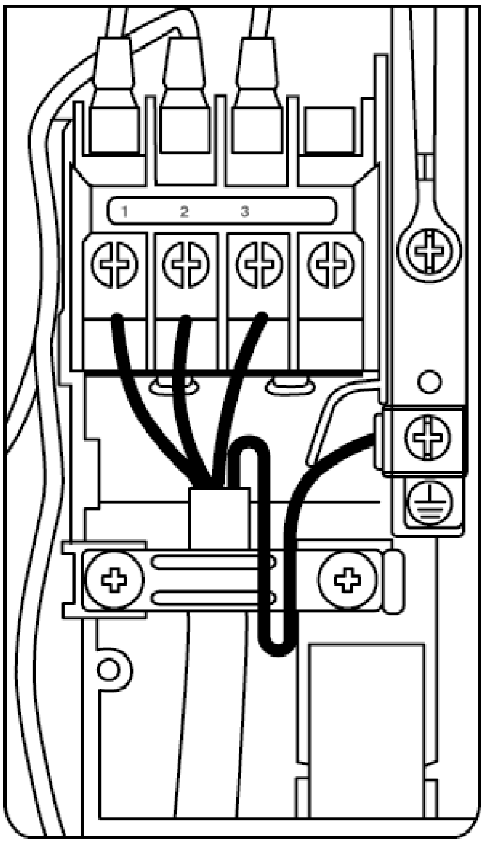
1. **The inside and outside connecting cable can be connected without removing the front grille.**
2. **Connecting cable between indoor unit and outdoor unit shall be approved polychloroprene sheathed 4 × 1.5 mm$_2$ flexible cord, type designation 245 IEC 57 or heavier cord.**

- Ensure the color of wires of outdoor unit and the terminal Nos. are the same to the indoor's respectively.

- Earth lead wire shall be longer than the other lead wires as shown in the figure for the electrical safety in case of the slipping out of the cord from the anchorage. /

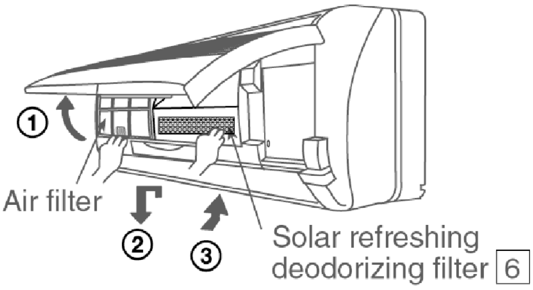
Terminals on the indoor unit	1	2	3	⏚
Color of wires	░	▒	▓	█
Terminals on the outdoor unit	1	2	3	⏚

- Secure the cable onto the control board with the holder (clamper).



INSTALLATION OF AIR PURIFYING FILTERS

1. **Open the front panel.**
2. **Remove the air filters.**
3. **Put air purifying filters (left) and solar refreshing deodorizing filter (right) into place as shown in illustration below.**

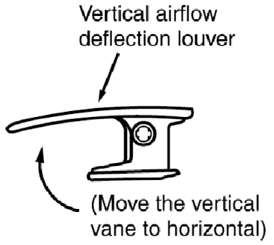

①
Air filter
②
③
Solar refreshing deodorizing filter 6

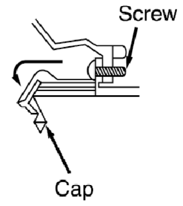
HOW TO TAKE OUT FRONT GRILLE

Please follow the steps below to take out front grille if necessary such as when servicing.

1. **Set the vertical airflow direction louver to the horizontal position.**
2. **Slide down the two caps on the front grille as shown in the illustration below, and then remove the two mounting screws.**
3. **Pull the lower section of the front grille towards you to remove the front grille.**

When reinstalling the front grille, first set the vertical airflow direction louver to the horizontal position and then carry out above steps 2 - 3 in the reverse order.



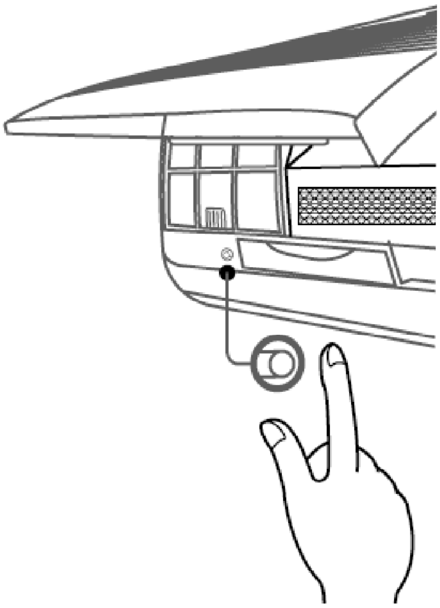


AUTO SWITCH OPERATION

The below operations will be performed by pressing the “AUTO” switch.

1. **AUTO OPERATION MODE**
   The Auto operation will be activated immediately once the Auto Switch is pressed.
2. **TEST RUN OPERATION (FOR PUMP DOWN/SERVICING PURPOSE)**
   The Test Run operation will be activated if the Auto Switch is pressed continuously for more than 5 sec. to below 10 sec.. A “pep” sound will occur at the fifth sec., in order to identify the starting of Test Run operation
3. **REMOTE CONTROLLER RECEIVING SOUND ON/OFF**
   The ON/OFF of Remote Controller receiving sound can be change over by pressing the “AUTO” Switch continuously for 10 sec. and above. A “pep”, “pep” sound will occur at the tenth sec., in order

to indicate the "ON/OFF" change over of remote control receiving sound.



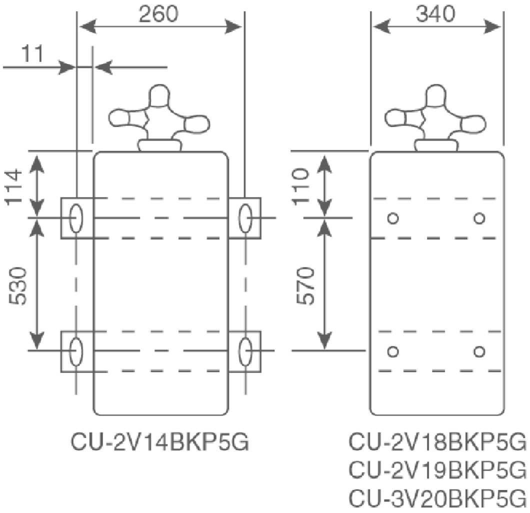
10.3. OUTDOOR UNIT

10.3.1. SELECT THE BEST LOCATION / (Refer to "Select the best location" section)

10.3.2. INSTALL THE OUTDOOR UNIT

- After selecting the best location, start installation according to Indoor/Outdoor Unit Installation Diagram.

1. **Fix the unit on concrete or rigid frame firmly and horizontally by bolt nut. (ø10 mm).**
2. **When installing at roof, please consider strong wind and earthquake. Please fasten the installation stand firmly with bolt or nails.**


260
11
114
530
340
110
570
CU-2V14BKP5G
CU-2V18BKP5G
CU-2V19BKP5G
CU-3V20BKP5G

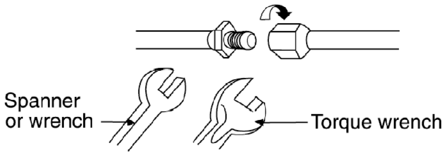
10.3.3. CONNECTING THE PIPING

Connecting the Piping to Indoor Unit

Please make flare after inserting flare nut (locate at joint portion of tube assembly) onto the copper pipe. (In case of using long piping)

Connect the piping

- **Align the center of piping and sufficiently tighten the flare nut with fingers.**
- **Further tighten the flare nut with torque wrench in specified torque as stated in the table.**


Spanner
or wrench
Torque wrench

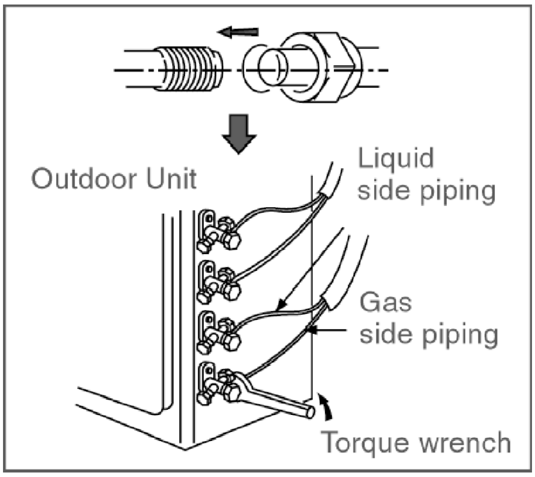
MODEL	Piping size (Torque)	
	Gas	Liquid
CS-V7BKPG	3/8” (42 N.m)	1/4” (18 N.m)
CS-V9BKPG	3/8” (42 N.m)	1/4” (18 N.m)
CS-V12BKPG	1/2” (55 N.m)	1/4” (18 N.m)

Connecting the Piping to Outdoor Unit

1. **Align the center of the piping and sufficiently tighten the flare nut with fingers.**
2. **Finally, tighten the flare nut with torque wrench until the wrench clicks.**

  - **When tightening the flare nut with torque wrench, ensure the**

direction for tightening follows the arrow on the wrench.



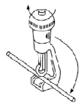
Caution

The CU-3V20BKP5G/V9BKPG have different cooling capacities depending on the connection to A1, A2 and/or B on CU-3V20BKP5G individually.
(Refer to SPECIFICATIONS on CATALOG)

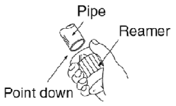
1. **The Cooling Capacity of Indoor Unit connecting "B" on CU-3V20BKP5G (Called B unit) is different from that of A1 and A2 Units.**
2. **A1 and A2 Units share the same compressor, their cooling capacities thus change depending on whether one, the other, or both of the units is in use.**
3. **Reflect the B or A (A1 and/or A2) on the Indoor Unit for later reference.**

CUTTING AND FLARING THE PIPING

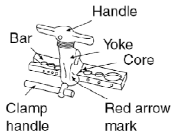
1. **Please cut using pipe cutter and then remove the burrs.**
2. **Remove the burrs by using reamer. If burrs is not removed, gas leakage may be caused.**
   Turn the piping end down to avoid the metal powder entering the pipe.
3. **Please make flare after inserting the flare nut onto the copper pipes.**



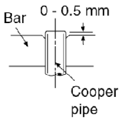
1. To cut

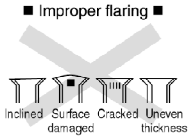

Pipe
Reamer
Point down

2. To remove burrs


Handle
Bar
Yoke
Core
Clamp handle
Red arrow mark

3. To flare

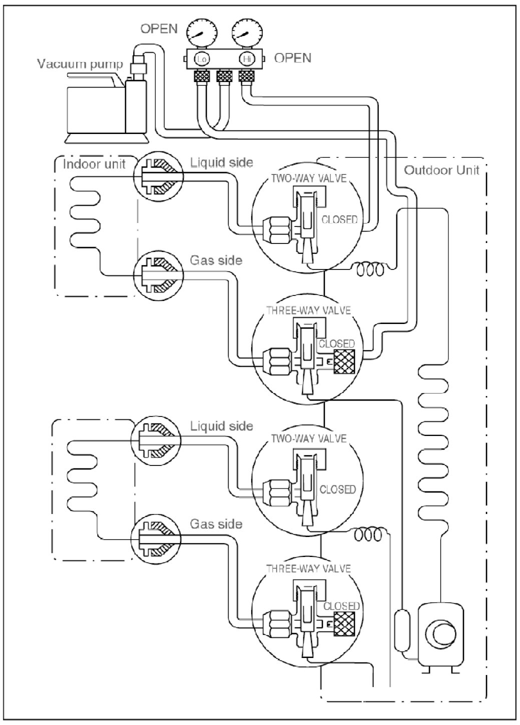

Bar
0 - 0.5 mm
Cooper pipe


■ Improper flaring ■
Inclined
Surface damaged
Cracked
Uneven thickness

When properly flared, the internal surface of the flare will evenly shine and be of even thickness. Since the flare part comes into contact with the connections, carefully check the flare finish

10.3.4. EVACUATION OF THE EQUIPMENT

WHEN INSTALLING AN AIR CONDITIONER, BE SURE TO EVACUATE THE AIR INSIDE THE INDOOR UNIT AND PIPES in the following procedure.


OPEN
OPEN
Vacuum pump
Indoor unit
Liquid side
Gas side
TWO-WAY VALVE
CLOSED
THREE-WAY VALVE
CLOSED
Outdoor Unit
Liquid side
Gas side
TWO-WAY VALVE
CLOSED
THREE-WAY VALVE
CLOSED

1. Connect a charging hose with a push pin to the Low and High side of a charging set and the service port of the 3-way valve.

- Be sure to connect the end of the charging hose with the push pin to the service port.

2. Connect the center hose of the charging set to a vacuum pump with check valve, or vacuum pump and vacuum pump adaptor.

3. Turn on the power switch of the vacuum pump and make sure that the needle in the gauge moves from 0 cmHg (0 MPa) to -76 cmHg (-0.1 MPa). Then evacuate the air approximately ten minutes.

4. **Close the Low side valve of the charging set and turn off the vacuum pump. Make sure that the needle in the gauge does not move after approximately five minutes.**
   Note: BE SURE TO FOLLOW THIS PROCEDURE IN ORDER TO AVOID REFRIGERANT GAS LEAKAGE.
5. **Disconnect the charging hose from the vacuum pump and from the service port of the 3-way valve.**
6. **Tighten the service port caps of the 3-way valve at torque of 18 N.m with a torque wrench.**
7. **Remove the valve caps of both of the 2-way valve and 3-way valve. Position both of the valves to “OPEN” using a hexagonal wrench (4 mm).**
8. **Mount valve caps onto the 2-way valve and the 3-way valve.**

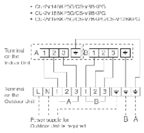
   - Be sure to check for gas leakage.

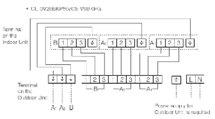
CAUTION

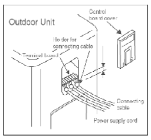
- If gauge needle does not move from 0 cmHg (0 MPa) to -76 cmHg (-0.1 MPa), in step 3 above ta
following measure:
- If the leak stops when the piping connections are tightened further, continue working from ste
- If the leak does not stop when the connections are retightened, repair the location of leak.
- Do not release refrigerant during piping work for installation and reinstallation. Take care of th
liquid refrigerant, it may cause frostbite.

10.3.5. CONNECT THE CABLE TO THE OUTDOOR UNIT

1. **Remove the control board cover from the unit by loosening the screw.**
2. **Connecting cable between indoor unit and outdoor unit shall be approved polychloroprene sheathed flexible cord, type designation 245 IEC 57 or heavier cord (4 × 1.5 mm$_2$).**
   Power supply cord cable use 3 × 1.5 mm$_2$ flexible cord, type designation 245 IEC 57 or heavier cord.


• CU-2V14BKP5G/CS-V9BKPG
• CU-2V18BKP5G/CS-V9BKPG
• CU-2V18BKP5G/CS-V7BKPG/CS-V12BKPG
Terminal on the Indoor Unit
A 1 2 3
B 1 2 3
Terminal on the Outdoor Unit
L N 1 2 3 1 2 3
A
B
Power supply for Outdoor Unit is required
B A


• CU-3V20BKP5G/CS-V9BKPG
Terminal on the Indoor Unit
B 1 2 3
A2 1 2 3
A1 1 2 3
Terminal on the Outdoor Unit
1 2 3 1 2 3 1 2 3
B
A2
A1
L N
A1 A2 B
Power supply for Outdoor Unit is required


Outdoor Unit
Control board cover
Holder for connecting cable
Terminal board
Connecting cable
Power supply cord

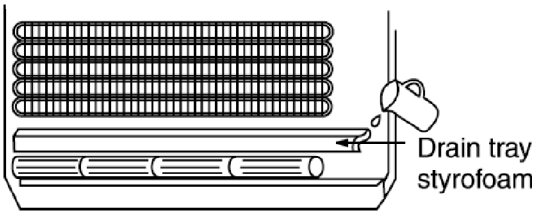
3. **Secure the cable onto the control board with the holder (clamper).**
4. **Confirm the SW1 Switch at AUTO position. (CU-2V14BKP5G, CU-3V20BKP5G)**
5. **Attach the control board cover back to the original position with the screw.**

10.3.6. PIPE INSULATION

1. **Please carry out insulation at pipe connection portion as mentioned in Indoor/Outdoor Unit Installation Diagram. Please wrap the insulated piping end to prevent water from going inside the piping.**
2. **If drain hose or connecting piping is in the room (where dew may form), please increase the insulation by using POLY-E FOAM with thickness 6 mm or above.**

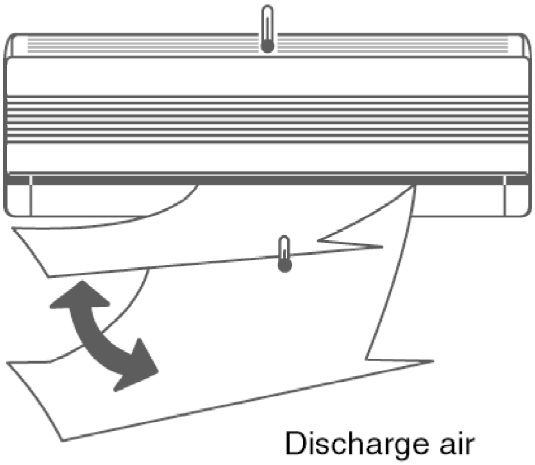
CHECK THE DRAINAGE

- **Open front panel and remove air filters. / (Drainage checking can be carried out without removing the front grille.)**
- **Pour a glass of water into the drain tray-styrofoam.**
- **Ensure that water flows out from drain hose of the indoor unit.**



EVALUATION OF THE PERFORMANCE

- **Operate the unit at cooling operation mode for fifteen minutes or more.**
- **Measure the temperature of the intake and discharge air.**
- **Ensure the difference between the intake temperature and the discharge is more than 8°C.**



NOTE:

These equipment shall be connected to a suitable mains network with a main impedance less than the following:
CS-V9BKPG / CU-2V14BKP5G: 0.35 Ω
CS-V9BKPG / CU-3V20BKP5G: 0.19 Ω
CS-V7BKPG, CS-V12BKPG / CU-2V19BKP5G: 0.20 Ω
CS-V9BKPG / CU-2V18BKP5G: 0.21 Ω

CHECK ITEMS

☐ **Is there any gas leakage at flare nut connections?**

☐ **Has the heat insulation been carried out at flare nut connection?**

☐ **Is the connecting cable being fixed to terminal board firmly?**

☐ **Is the connecting cable being clamped firmly?**

☐ **Is the drainage OK?**
(Refer to "Check the drainage" section)

☐ **Is the earth wire connection properly done?**

☐ **Is the indoor unit properly hooked to the installation plate?**

☐ **Is the power supply voltage complied with rated value?**

☐ **Is there any abnormal sound?**

☐ **Is the cooling operation normal?**

☐ **Is the thermostat operation normal?**

☐ **Is the remote control's LCD operation normal?**

☐ **Is the air purifying filter installed?**

11. Installation and Servicing Air Conditioner Using R410A

11.1. OUTLINE

11.1.1. About R410A Refrigerant

1. **Converting air conditioners to R410A / Since it was declared in1974 that chlorofluorocarbons (CFC), hydro chlorofluorocarbons (HCFC) and other substances pose a destructive danger to the ozone layer in the earth~s upper stratosphere (20 to 40 km above the earth), measures have been taken around the world to prevent this destruction. / The R22**

refrigerant which has conventionally been used in ACs is an HCFC refrigerant and, therefore, possesses this ozone-destroying potential. International regulations (the Montreal Protocol Ozone-Damaging Substances) and the domestic laws of various countries call for the early substitution of R22 by a refrigerant which will not harm the ozone layer.

- In ACs, the HFC refrigerant which has become the mainstream alternative called R410A.Compared with R22, the pressure of R410A is approximately 1.6 times as high at the same refrigerant temperature, but the energy efficiency is about the same. Consisting of hydrogen (H), fluorine (F) and carbon (C), R410A is an HFC refrigerant. Another typical HFC refrigerant is R407C. While the energy efficiency of R407C is some what inferior to that of R410A, it offers the advantage of having pressure characteristics which are about the same as those of R22, and is used mainly in packaged ACs.

2. The characteristics of HFC (R410A) refrigerants

A. Chemical characteristics / The chemical characteristics of R410A are similar to those of R22 in that both are chemically stable, non-flammable refrigerants with low toxicity. / However, just like R22, the specific gravity of R410A gas is heavier than that of air. Because of this, it can cause an oxygen deficiency if it leaks into a closed room since it collects in the lower area of the room. It also generates toxic gas when it is directly exposed to a flame, so it must be used in a well ventilated environment where it will not collect.

Table 1 Physical comparison of R410A and R22

	R410A	R22
Composition (wt%)	R32/R125 (50/50)	R22 (100)
Boiling point (°C)	-51.4	-40.8
Vaporizing pressure (25°C)	1.56 Mpa (15.9 kgf/cm^2)	0.94 Mpa (9.6 kgf/cm^2)
Saturated vapor density	64.0 kg/m^3	44.4 kg/m^3
Flammability	Non-flammable	Non-flammable
Ozone-destroying point (ODP)	0	0.005
Global-warming point (GWP)	1730	1700

B. Compositional change (pseudo-azeotropic characteristics) /

R410A is a pseudo-azeotropic mixture comprising the two components R32 and R125. Multi-component refrigerants with these chemical characteristics exhibit little compositional change even from phase changes due to vaporization 9or condensation), which means that there is little change in the circulating refrigerant composition even when the refrigerant leaks from the gaseous section of the piping. / Accordingly, R410A can be handled in almost the same manner as the single-component refrigerant R22. However, when charging, because there is a slight change in composition between the gas phase and the liquid phase inside a cylinder or other container, charging should basically begin with the liquid side.

C. Pressure characteristics / As seen in Table 2, the gas pressure of R410A is approximately 1.6 times as high as that of R22 at the same refrigerant temperature, which means that special R410A tools and materials with high-pressure specifications must be used for all refrigerant piping work and servicing.

Table 2 Comparison of R410A and R22 saturated vapor density / Unit: MPa

Refrigerant Temperature (°C)	R410A	R22
-20	0.30	0.14
0	0.70	0.40
20	1.35	0.81
40	2.32	1.43
60	3.73	2.33
65	4.15	2.60

D. R410A refrigerating machine oil / Conventionally, mineral oil or a synthetic oil such as alkylbenzene has been used for R22 refrigerating machine oil. Because of the poor compatibility between R410A and conventional oils like mineral oil, however, there is a tendency for the refrigerating machine oil to collect in the refrigerating cycle. For this reason, polyester and other synthetic oils which have a high compatibility with R410A are used as refrigerating machine oil. / Because of the high hygroscopic property of synthetic oil, more care must be taken in its handling than was necessary with conventional refrigerating machine oils. Also, these synthetic oils will degrade if mixed with mineral oil or alkylbenzene, causing

clogging in capillary tubes or compressor malfunction. Do not mix them under any circumstances.

11.1.2. Safety Measure When Installing / Receiving Refrigerant Piping

Cause the gas pressure of R410A is approximately 1.6 times as high as that of R22, a mistake in installation or servicing could result in a major accident. It is essential that you use R410a tools and materials, and that you observe the following precautions to ensure safety.

1. **Do not use any refrigerant other than R410A in ACs that have been used with R410A.**
2. **If any refrigerant gas leaks while you are working, ventilate the room. Toxic gas may be generated if refrigerant gas is exposed to a direct flame.**
3. **When installing or transferring an AC, do not allow any air or substance other than R410A to mix into the refrigeration cycle. If it does, the pressure in the refrigeration cycle can become abnormally high, possibly causing an explosion and/or injury.**
4. **After finishing the installation, check to make sure there is no refrigerant gas leaking.**
5. **When installing or transferring an AC, follow the instructions in the installation instructions carefully. Incorrect installation can result in an abnormal refrigeration cycle or water leakage, electric shock, fire, etc.**
6. **Do not perform any alterations on the AC unit under any circumstances. Have all repair work done by a specialist. Incorrect repairs can result in an water leakage, electric shock, fire, etc.**

11.2. TOOL FOR INSTALLING / SERVICING REFRIGERANT PIPING

11.2.1. Necessary Tools

In order to prevent an R410A AC from mistakenly being charged with any other refrigerant, the diameter of the 3-way valve service port on the outdoor unit has been changed. Also, to increase its ability to withstand pressure, the opposing dimensions have been changed for the refrigerant pipe flaring size and flare nut. Accordingly, when installing or servicing refrigerant piping, you must have both the R410A and ordinary tools listed below.

Table 3 Tools for installation, transferring or replacement

Type of work	Ordinary tools	R410A tools
Flaring	Flaring tool (clutch type), pipe cutter, reamer	Copper pipe gauge for clearance Adjustment, flaring tool (clutch type)*1)
Bending, connecting pipes	Torque wrench (nominal diameter 1/4, 3/8,1/2) Fixed spanner (opposing sides 12 mm, 17 mm, 19 mm) Adjustable wrench, Spring bender	
Air purging	Vacuum pump Hexagonal wrench (opposing sides 4 mm)	Manifold gauge, charging hose, vacuum pump adaptor
Gas leak inspection	Gas leak inspection fluid or soapy water	Electric gas leak detector for HFC refrigerant*2)

***1) You can use the conventional (R22) flaring tool. If you need to buy a new tool, buy the R410A type.**
***2) Use when it is necessary to detect small gas leaks.**
For other installation work, you should have the usual tools, such as screwdrivers (+,-), a metal-cutting saw, an electrical drill, a hole core drill (65 or 70 dia.), a tape measure, a level, a thermometer, a clamp meter, an insulation tester, a voltmeter, etc.

Table 4 Tools for serving

Type of work	Ordinary tools	R410A tools
Refrigerant charging		Electronic scale for refrigerant charging Refrigerant cylinder Charging orifice and packing for refrigerant cylinder
Brazing (Replacing refrigerating cycle part*1)	Nitrogen blow set (be sure to use nitrogen blowing for all brazing), and brazing), and brazing machine	

***1) Always replace the dryer of the outdoor unit at the same time. The replacement dryer is wrapped in a vacuum pack. Replace it last among the refrigerating cycle parts. Start brazing as soon as you have opened the vacuum pack, and begin the vacuuming operation within 2 hours.**

11.2.2. R410A Tools

1. Cooper tube gauge for clearance adjustment / (used when flaring with the conventional flaring tool (clutch type))

- This gauge makes it easy to set the clearance for the copper tube to 1.0-1.5 mm from the clamp bar of the flaring tool.

2. Flaring tool (clutch type)

- In the R410A flaring tool, the receiving hole for the clamp bar is enlarged so the clearance from the clamp bar can be set to 0 -0.5 mm, and the spring inside the tool is strengthened to

increase the strength of the pipe-expanding torque. This flaring tools can also be used with R22 piping, so we recommend that you select it if you are buying a new flaring tool.

3. Torque wrenches

Fig. 1 Copper tube gauge for clearance adjustment

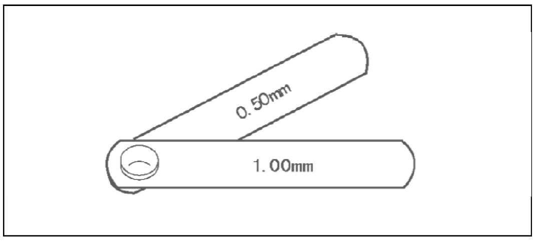


Fig. 2 Flaring tool (clutch type)

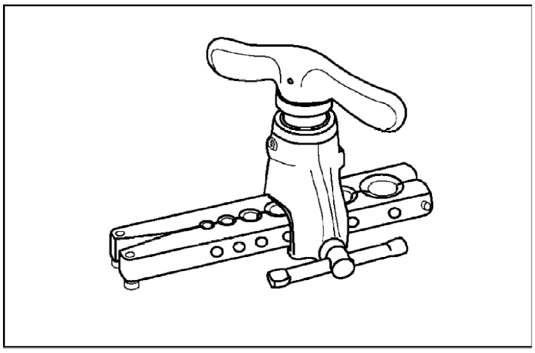


Fig. 3 Torque wrenches

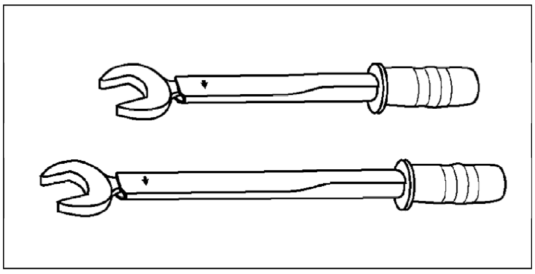


Table 5

	Conventional wrenches	R410A wrenches
For 1/4 (opposite side x torque)	17 mm x 18 N.m (180 kgf.cm)	17 mm x 18 N.m (180 kgf.cm)
For 3/3 (opposite side x torque)	22 mm x 42 N.m (180 kgf.cm)	22 mm x 42 N.m (180 kgf.cm)
For 1/2 (opposite side x torque)	24 mm x 55 N.m (180 kgf.cm)	26 mm x 55 N.m (180 kgf.cm)

4. Manifold gauge

- Because the pressure is higher for the R410A type, the conventional type cannot be used.

Table 6 Difference between R410A and conventional high / low-pressure gauges

	Conventional wrenches	R410A wrenches
High-pressure gauge (red)	-76 cmHg - 35 kgf/cm3	-0.1 - 5.3 Mpa -76 cmHg - 53 kgf/ cm3
High-pressure gauge (blue)	-76 cmHg - 17 kgf/cm3	-0.1 - 3.8 Mpa -76 cmHg - 38 kgf/ cm3

- The shape of the manifold ports has been changed to prevent the possibility of mistakenly charging with another type of refrigerant.

Table 7 Difference between R410A and conventional manifold port size

	Conventional gauges	R410A gauges
Port size	7/6 UNF 20 threads	1/2 UNF 20 threads

5. Charging hose

- The pressure resistance of the charging hose has been raised to match the higher pressure of R410A. The hose material has also been changed to suit HFC use, and the size of the fitting has been changed to match the manifold ports.

Fig. 4 Manifold gauge charging hose

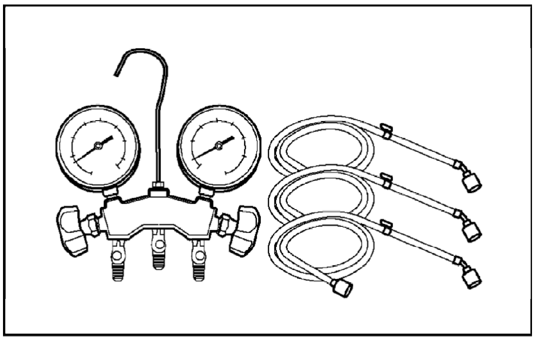


Table 8 Difference between R410A and conventional charging hoses

		Conventional hoses	R410A hoses
Pressure resistance	Working pressure	3.4 MPa (35 kgf/cm3)	5.1 MPa (52 kgf/cm3)
	Bursting pressure	17.2 MPa (175 kgf/cm3)	27.4 MPa (280 kgf/cm3)
Material		NBR rubber	HNBR rubber Nylon coating inside

6. Vacuum pump adaptor

- When using a vacuum pump for R410A, it is necessary to install an electromagnetic valve to prevent the vacuum pump oil from flowing back into the charging hose. The vacuum

pump adaptor is installed for that purpose. if the vacuum pump oil (mineral oil) becomes mixed with R410A, it will damage the unit.

7. Electric gas leak detector for HFC refrigerant

- **The leak detector and halide torch that were used with CFC and HCFC cannot be used with R410A (because there is no chlorine in the refrigerant).**
- **The present R134a leak detector can be used, but the detection sensitivity will be lower (setting the sensitivity for R134a at 1, the level for R410A will drop to 0.6).**
- **For detecting small amounts of gas leakage, use the electric gas leak detector for HFC refrigerant. (Detection sensitivity with R410A is about 23 g/year).**

Fig. 5 Vacuum pump adaptor

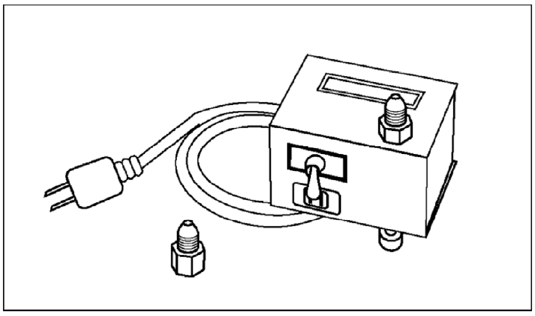
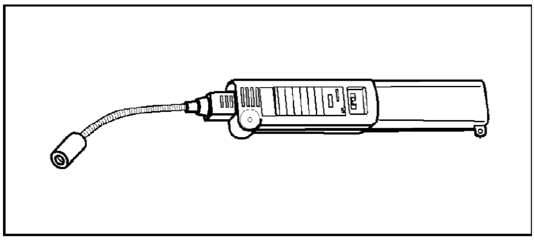


Fig. 6 Electric gas leak detector for HFC refrigerant



8. Electronic scale for refrigerant charging

- **Because of the high pressure and fast vaporizing speed of R410A, the refrigerant cannot be held in a liquid phase inside the charging cylinder when charging is done using the charging cylinder method, causing bubbles to form in the measurement scale glass and making it difficult to see the reading. (Naturally, the conventional R22 charging cylinder cannot be used because of the differences in the pressure** resistance, scale gradation, connecting port size, etc.)

- The electronic scale has been strengthened by using a structure in which the weight detector for the refrigerant cylinder is held by four supports. It is also equipped with two connection ports, one for R22 *7/16 UNF, 20 threads) and one for R410A (1/2 UNF, 20 threads), so it can also be used for conventional refrigerant charging.
- There are two types of electronic scales, one for 10-kg cylinders and one for 20-kg cylinders. (The 10-kg cylinder is recommended.)

  Refrigerant charging is done manually by opening and closing the valve.

9. Refrigerant cylinders

- The R410A cylinders are labeled with the refrigerant name, and the coating color of the cylinder protector is pink, which is the color stipulated by ARI of the U.S.
- Cylinder equipped with a siphon tube are available to allow the cylinder to stand upright for liquid refrigerant charging.

10. Charging orifice and packing for refrigerant cylinders

- The charging orifice must match the size of the charging hose fitting (1/2 UNF, 20 threads).
- The packing must also be made of an HFC-resistant material.

Fig. 7 Electronic scale for refrigerant charging

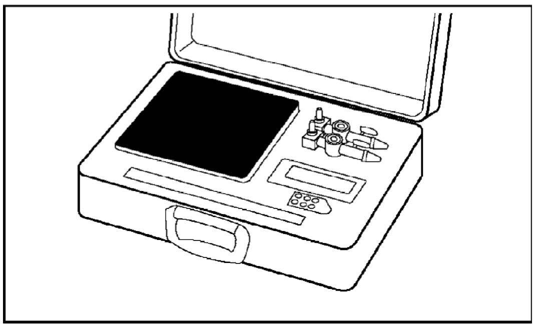


Fig. 8 Refrigerant cylinders

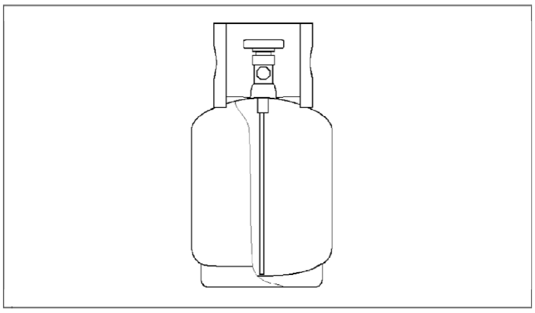
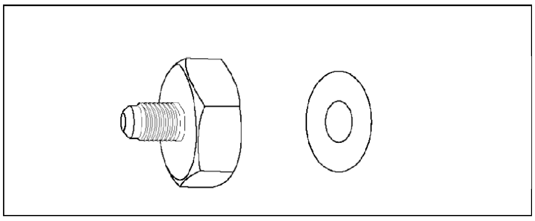


Fig. 9 Charging orifice and packing



11.2.3. R410A Tools Which Are Usable for R22 Models

Table 9 R410A tools which are usable for R22 models

	R410A tools	Usable for R22 models
(1)	Copper tube gauge for clearance adjustment	OK
(2)	Flaring tool (clutch type)	OK
(3)	Manifold gauge	NG
(4)	Charging hose	NG
(5)	Vacuum pump adaptor	OK
(6)	Electric gas leak detector for HFC refrigerant	NG
(7)	Electronic scale for refrigerant charging	OK
(8)	Refrigerant cylinder	NG
(9)	Charging orifice and packing for refrigerant cylinder	NG

11.3. REFRIGERANT PIPING WORK

11.3.1. Piping Materials

It is recommended that you use copper and copper alloy jointless pipes with a maximum oil adherence of 40 mg/10m. Do not used pipes that are crushed, deformed, or discolored (especially the inside surface). If these inferior pipes are used, impurities may clog the expansion valves or capillaries. / Because the pressure of ACs using R410A is higher than those using R22, it is essential that you select materials that are appropriate for these standards. / The thickness of the copper tubing used for R410A is shown in Table 10. Please be aware that tubing with a thickness of only 0.7 mm is also available on the market, but this should never be used.

Table 8 Difference between R410A and conventional charging hoses

Soft pipe		Thickness (mm)	
Nominal diameter	Outside diameter (mm)	R410A	(Reference) R22
1/4	6.35	0.80	0.80
3/8	9.52	0.80	0.80
1/2	12.7	0.80	0.80

11.3.2. Processing and Connecting Piping Materials

When working with refrigerant piping, the following points must be carefully observed: no moisture od dust must be allowed to enter the piping, and there must be no refrigerant leaks.

1. Procedure and precautions for flaring work

- **A. Cut the pipe / Use a pipe cutter, and cut slowly so the pipe will not be deformed.**
- **B. Remove burrs and clean shavings from the cut surface / If the shape of the pipe end is poor after removing burrs, or if shavings adhere to the flared area, it may lead to refrigerant leaks. / To prevent this, turn the cut surface downward and remove burrs, then clean the surface, carefully.**
- **C. Insert the flare nut (be sure to used the same nut that is used on the AC unit)**
- **D. Flaring / Check the clamp bar and the cleanliness of the copper pipe. / Be sure to sued the clamp bar to do the flaring with accuracy. Use either an R410A flaring tool, or a conventional flaring tool. flaring tools come in different sizes, so be sure to check the size before using. When using a conventional flaring tool, use the copper pipe gauge for clearance adjustment, etc., to ensure the correct A dimension (see Fig. 10)**

Fig. 10 Flaring dimensions

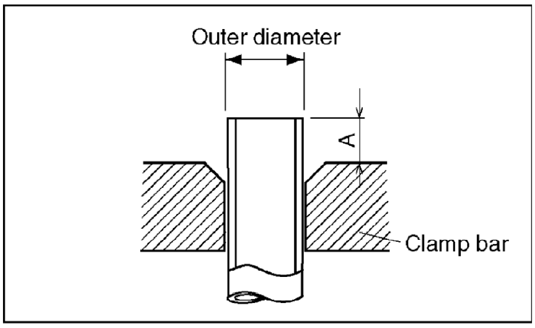


Fig. 11 Relation between the flare nut structure and flaring tool end

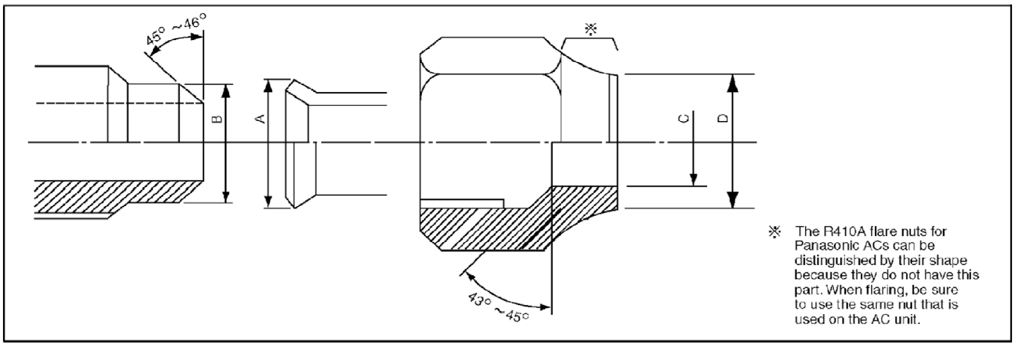

45° ~46°
※
B
A
C
D
43° ~45°
※ The R410A flare nuts for Panasonic ACs can be distinguished by their shape because they do not have this part. When flaring, be sure to use the same nut that is used on the AC unit.

Table 11 R410A flaring dimensions

Nominal diameter	Outside diameter (mm)	Wall thickness (mm)	A (mm)		
			R410A flaring tool, clutch type	Conventional flaring tool	
				Clutch type	Wing-nut type
1/4	6.35	0.8	0 - 0.5	1.0 - 1.5	1.5 - 2.0
3/8	9.52	0.8	0 - 0.5	1.0 - 1.5	1.5 - 2.0
1/2	12.70	0.8	0 - 0.5	1.0 - 1.5	2.0 - 2.5

Table 12 R410A flaring dimensions

Nominal diameter	Outside diameter (mm)	Wall thickness (mm)	A (mm)		
			R410A flaring tool, clutch type	Conventional flaring tool	
				Clutch type	Wing-nut type
1/4	6.35	0.8	0 - 0.5	0.5 - 1.0	1.0 - 1.5
3/8	9.52	0.8	0 - 0.5	0.5 - 1.0	1.0 - 1.5
1/2	12.70	0.8	0 - 0.5	0.5 - 1.0	1.5 - 2.0

Table 13 R410A flaring and flare nut dimensions Unit: mm

Nominal diameter	Outside diameter (mm)	Wall thickness (mm)	A +0, -0.4	B dimension	C dimension	D dimension	Flare nut width
1/4	6.35	0.8	9.1	9.2	6.5	13	17
3/8	9.52	0.8	13.2	13.5	9.7	20	22
1/2	12.70	0.8	16.6	16.0	12.9	23	26

Table 14 R410A flaring and flare nut dimensions Unit: mm

Nominal diameter	Outside diameter (mm)	Wall thickness (mm)	A +0, -0.4	B dimension	C dimension	D dimension	Flare nut width
1/4	6.35	0.8	9.0	9.2	6.5	13	17
3/8	9.52	0.8	13.0	13.5	9.7	20	22
1/2	12.70	0.8	16.2	16.0	12.9	20	24

2. Procedure and precautions for flare connection

A. Check to make sure there are no scratches, dust, etc., on the flare and union.

B. Align the flared surface with the axial center of the union.

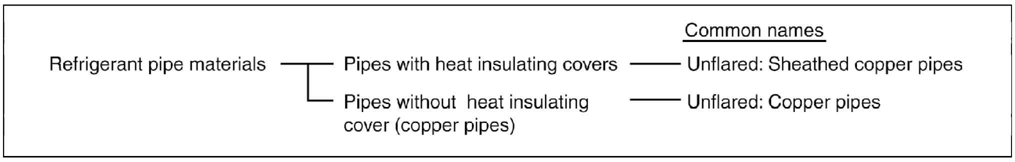
C. Use a torque wrench, and tighten to the specified torque. The tightening torque for R410A is the same as the conventional torque value for R22. Be careful, because if the torque is too weak, it may lead to a gas leak. If it is too strong, it may split the flare nut or make it impossible to remove the flare nut.

Table 15 R410A tightening torque

Nominal diameter	Outside diameter (mm)	Tightening torque N.m (kgf.cm)	Torque wrench tightening torque N.m (kgf.cm)
1/4	6.35	14 - 18 (140 - 180)	18 (180)
3/8	9.52	33 - 42 (330 -420)	42 (420)
1/2	12.70	55 (550)	55 (550)

11.3.3. Storing and managing Piping Materials

1. Types of piping and their storage / The following is a general classification of the refrigerant pipe materials used for ACs.


Common names
Refrigerant pipe materials
Pipes with heat insulating covers
Unflared: Sheathed copper pipes
Pipes without heat insulating cover (copper pipes)
Unflared: Copper pipes

Because the gas pressure of R410A is approximately 1.6 times as high as that of R22, copper pipes with the thickness shown in Table 10, and with minimal impurities must be used. Care must also be taken during storage to ensure that pipes are not crushed, deformed, or scratched, and that no dust, moisture or other substance enters the pipe interior. When storing sheathed copper pipes or plain copper pipes, seal the openings by pinching or taping them securely.

2. Makings and management

A. Sheathed copper pipes and copper-element pipes / When using these pipes, check to make sure that they are the stipulated thickness. For flare nuts, be sure to used the same nut that is

used on the AC unit.

B. Copper pipes / Use only copper pipes with the thickness given in table 10, and with minimal impurities. Because the surface of the pipe is exposed, you should take special care, and also take measures such as marking the pipes to make sure they are easily distinguished from other piping materials, to prevent mistaken use.

3. Precautions during refrigerant piping work / Take the following precautions on-site when connecting pipes. (Keep in mind that the need to control the entry of moisture and dust is even more important that in conventional piping).

   A. Keep the open ends of all pipes sealed until connection with AC equipment is complete.

   B. Take special care when doing piping work on rainy days. The entering of moisture will degrade the refrigerating machine oil, and lead to malfunctions in the equipment.

   C. Complete all pipe connections in as short a time as possible. If the pipe must be left standing for a long time after removing the seal, it must be thoroughly purged with nitrogen, or dried with a vacuum pump.

11.4. INSTALLATION, TRANSFERRING, SERVICING

11.4.1. Inspecting Gas Leaks with a Vacuum Pump for New Installations (Using New Refrigerant Piping)

1. From the viewpoint of protecting the global environment, please do not release refrigerant into the atmosphere.

   A. Connect the projecting side (pin-pushing side) of the charging hose for the manifold gauge to the service port of the 3-way valve. (1)

   B. Fully open the handle Lo of the manifold gauge and run the vacuum pump. (2) (If the needle of the low-pressure gauge instantly reaches vacuum, re-check step a).)

   C. Continue the vacuum process for at least 15 minutes, then check to make sure the low-pressure gauge has reached -0.1 MPa (-76 cmHg). Once the vacuum process has finished, fully close the handle Lo of the manifold gauge and stop the vacuum pump operation, then remove the charging hose that is connected to the vacuum pump adaptor. (Leave the unit in that condition for 1-2 minutes, and make sure that the needle of the manifold gauge does not return.) (2) and (3)

D. Turn the valve stem of the 2-way valve 90 counter-clockwise to open it, then, after 10 seconds, close it and inspect for a gas leak (4)

E. Remove the charging hose from the 3-way valve service port, then open both the 2-way valve and 3-way valve. (1) (4) (Turn the valve stem in the counter-clockwise direction until it gently makes contact. Do not turn it forcefully).

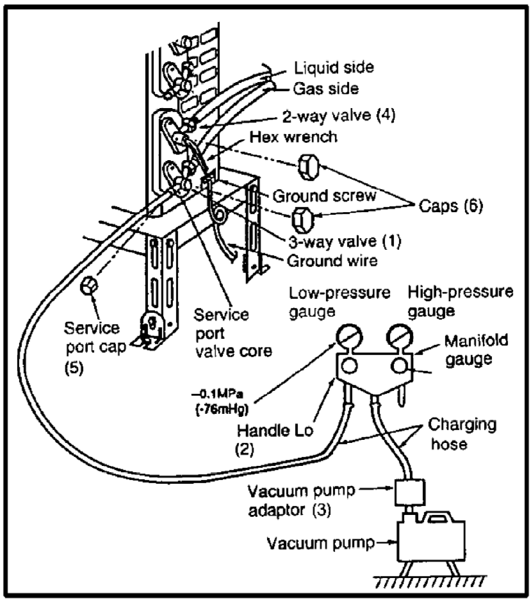
F. Tighten the service port cap with a torque wrench (18 N.m (1.8 kgf.m)). (5) Then tighten the 2-way valve and 3-way valve caps with a torque wrench (42 N.m (4.2 kgf.m)) or (55 N.m (5.5 kgf.m)).

G. After attaching each of the caps, inspect for a gas leak around the cap area. (5) (6)

Precautions

- Be sure to read the instructions for the vacuum pump, vacuum pump adaptor and manifold gauge prior to use, and follow the instructions carefully.
- Make sure that the vacuum pump is filled with oil up to the designated line on the oil gauge.
- The gas pressure back flow prevention valve on the charging hose is generally open during use. When you are removing the charging hose from the service port, it will come off more easily if you close this valve.

Fig. 12 Vacuum pump air purging configuration


Liquid side
Gas side
2-way valve (4)
Hex wrench
Ground screw
Caps (6)
3-way valve (1)
Ground wire
Low-pressure gauge
High-pressure gauge
Service port cap (5)
Service port valve core
Manifold gauge
–0.1MPa (-76mHg)
Handle Lo (2)
Charging hose
Vacuum pump adaptor (3)
Vacuum pump

11.4.2. Transferring (Using New Refrigerant Piping)

1. Removing the unit

A. Collecting the refrigerant into the outdoor unit by pumping down / The refrigerant can be collected into the outdoor unit (pumping down) by pressing the TEST RUN button, even when the temperature of the room is low.

- **Check to make sure that the valve stems of the 2-way valve and 3-way valve have been opened by turning them counter-clockwise. (Remove the valve stem caps and check to see that the valve stems are fully opened position. Always use a hex wrench (with 4-mm opposing sides) to operate the valve stems.)**
- **Press the TEST RUN button on the indoor unit, and allow preliminary for 5-6 minutes. (TEST RUN mode)**
- **After stopping the operation, let the unit sit for about 3 minutes, then close the 2-way valve by turning the valve stem in the clockwise direction.**
- **Press the TEST RUN button on the indoor unit again, and after 2-3 minutes of operation, turn the valve stem of the 3-way valve quickly in the clockwise direction to close it, then stop the operation.**
- **Tighten the caps of the 2-way valve and 3-way valve to the stipulated torque.**

- **Remove the connection pipes (liquid side and gas side).**

2. **Installing the unit / Install the unit using new refrigerant piping. Follow the instructions in section 4.1 to evacuate the pipes connecting the indoor and outdoor units, and the pipes of the indoor unit, and check for gas leaks.**

11.4.3. AC Units Replacement (Using Existing Refrigerant Piping)

When replacing and R410A AC unit with another R410A AC unit, you should re-flare the refrigerant piping. Even though the replacement AC unit uses the R410A, problems occur when, for example, either the AC unit maker or the refrigerating machine oil is different. / When replacing an R22 AC unit with an R410A AC unit, the following checks and cleaning procedures are necessary but are difficult to do because of the chemical characteristics of the refrigerating machine oil (as described in items c) and d) of section 10.1.1.(2)). In this case, you should use new refrigerant piping rather than the existing piping.

1. **Piping check / Because of the different pressure characteristics of R22 and R410A, the design pressure for the equipment is 1.6 times different. the wall thickness of the piping must comply with that shown in Table 10, but this is not easy to check. Also, even if the thickness is correct, there may be flattened or bent portions midway through the piping due to sharp curves. Buried sections of the piping also cannot be checked.**
2. **Pipe cleaning / A large quantity of refrigerating machine oil (mineral oil) adheres to existing pipes due to the refrigeration cycle circulation. If the pipes are used just as they are for the R410A cycle, the capacity will be lowered due to the incompatibility of this oil with the R410A, or irregularities may occur in the refrigeration cycle. For this reason, the piping must be thoroughly cleaned, but this is difficult with the present technology.**

11.4.4. Refrigerant Compatibility (Using R410A Refrigerant in R22 ACs and Vice Versa)

Do not operate an existing R22 AC with the new R410A refrigerant. Doing so would result in improper functioning of the equipment or malfunction, and might lead to a major accident such as an explosion in the refrigeration cycle. Similarly, do not operate an R410A AC with R22 refrigerant. The chemical reaction between the refrigerating machine oil used in R410A ACs and the chlorine that is contained in R22 would cause the refrigerating machine oil to degrade and lead to malfunction.

11.4.5. Recharging Refrigerant During Servicing

When recharging is necessary, insert the specified amount of new refrigerant in accordance with the following procedure.

1. **Connect the charging hose to the service port of the outdoor unit.**
2. **Connect the charging hose to the vacuum pump adaptor. At this time, fully open the 2-way valve and 3-way valve.**
3. **Fully open the handle Lo of the manifold gauge, turn on the power of the vacuum pump and continue the vacuum process for at least one hour.**
4. **Confirm that the low pressure gauge shows a reading of -0.1 Mpa (-76 cmHg), then fully close the handle Lo, and turn off the vacuum pump. Wait for 1-2 minutes, then check to make sure that the needle of the Low pressure gauge has not returned. See Fig. 13 for the remaining steps of this procedure.**
5. **Set the refrigerant cylinder onto the electronic scale, then correct the hose the cylinder and to the connection port for the electronic scale. (1)(2)**

   Precaution:

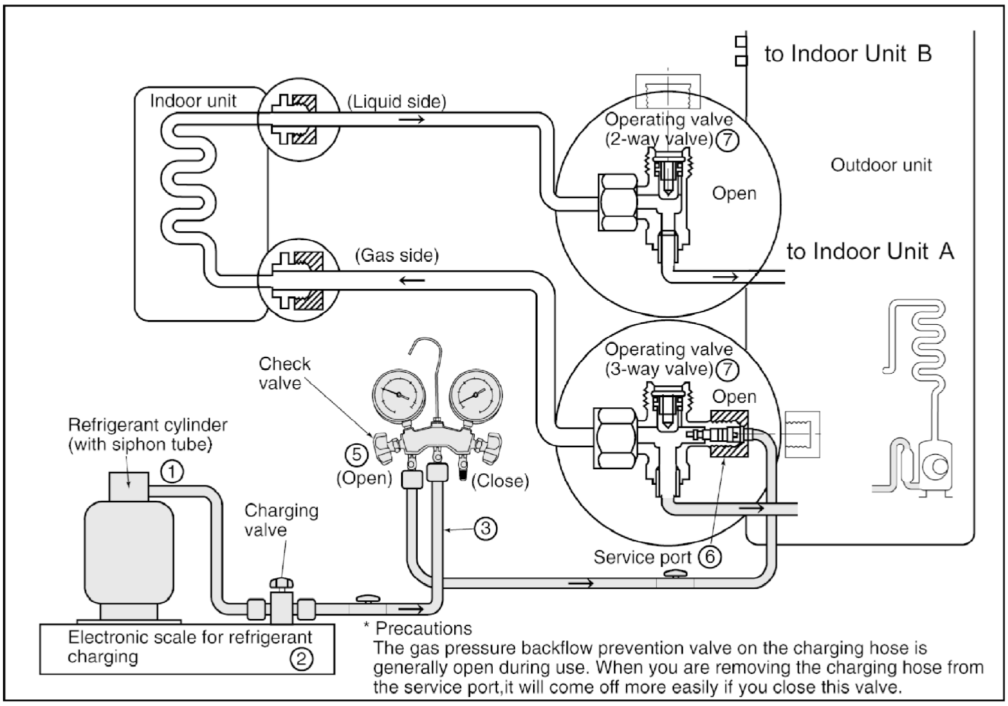
   Be sure to set up the cylinder for liquid charging. If you use a cylinder equipped with a siphon tube, you can charge the liquid without having to turn the cylinder around
6. **Remove the charging hose of the manifold gauge from the vacuum pump adaptor, and connect it to the connection port of the electronic scale. (2)(3)**
7. **Open the valve of the refrigerant cylinder, then open the charging valve slightly and close it. Next, press the check valve of the manifold gauge and purge the air. (2)(4) (Watch the liquid refrigerant closely at this point.)**
8. **After adjusting the electronic scale to zero, open the charging valve, then open the valve Lo of the manifold gauge and charge with the liquid refrigerant. (2)(5) (Be sure to read the operating instructions for the electronic scale.)**
9. **If you cannot charge the stipulated amount, operate the unit in the cooling mode while charging a little of the liquid at a time (about 150 g/time as a guideline). If the charging amount is insufficient from one operation, wait about one minute, then use the same procedure to do the liquid charging again.**

Precaution:

Never use the gas side to allow a larger amount of liquid refrigerant to be charged while operating the unit.

10. **Close the charging valve, and after charging the liquid refrigerant inside the charging hose, fully close the valve Lo of the manifold gauge, and stop the operation of the unit. (2)(5)**
11. **Quickly remove the charging hose from the service port. (6) If you stop midway through, the refrigerant that is in the cycle will be discharged.**
12. **After putting on the caps for the service port and operating valve, inspect around the caps for a gas leak. (6)(7)**

Fig. 13 Re-charging refrigerant


to Indoor Unit B
Indoor unit
(Liquid side)
Operating valve
(2-way valve)⑦
Outdoor unit
Open
(Gas side)
to Indoor Unit A
Check valve
Operating valve
(3-way valve)⑦
Open
Refrigerant cylinder
(with siphon tube)
①
⑤
(Open)
(Close)
Charging valve
③
Service port ⑥
Electronic scale for refrigerant charging ②

* Precautions
The gas pressure backflow prevention valve on the charging hose is generally open during use. When you are removing the charging hose from the service port,it will come off more easily if you close this valve.

11.4.6. Brazing

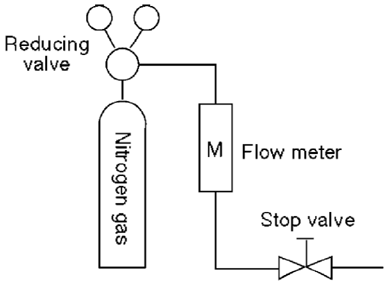
As brazing requires sophisticated techniques and experiences, it must be performed by a qualified person. / In order to prevent the oxide film from occurring in the pipe interior during brazing, it is effective to proceed with brazing while letting dry nitrogen gas (N_2) flow.

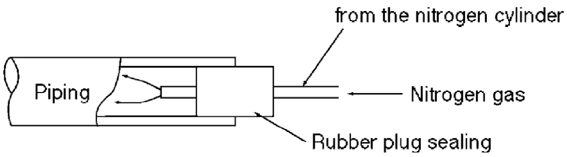
<Brazing Method for Preventing Oxidation>

1. **Attach a reducing valve to the nitrogen gas cylinder.**
2. **Attach a reducing valve to the nitrogen gas cylinder.**
3. **Apply a seal onto the clearance between the piping and inserted pipe for the nitrogen gas in order to prevent the nitrogen gas from**

flowing backward.

4. When the nitrogen gas is flowing, be sure to keep the piping end open.
5. Adjust the flow rate of nitrogen gas so that it is lower than 0.05 m^3/h, or 0.02 MPa (0.2 kgf/cm^2) by means of the reducing valve.
6. After taking the steps above, keep the nitrogen gas flowing until the piping cools down to a certain extent (i.e. temperature at which pipes are touchable with finger).
7. Completely remove the flux after brazing.





Cautions during brazing

1. General Cautions
   - A. The brazing strength should be high as required.
   - B. After operation, airtightness should be kept under pressurized condition.
   - C. During brazing do not allow component materials to become damaged due to overheating.
   - D. The refrigerant pipe work should not become blocked with scale or flux.
   - E. The brazed part should not restrict the flow in the refrigerant circuit.
   - F. No corrosion should occur from the brazed part.
2. Preventing of Overheating

   Due to heating, the interior and exterior surfaces of treated metal may oxidize. Especially, when the interior of the refrigerant circuit oxidizes due to overheating, scale occurs and stays in the circuit as dust, thus exerting a fatally adverse effect. So, make brazing at adequate brazing temperature and with minimum of heating area.
3. Overheating Protection

In order to prevent components near the brazed part from overheating damaged or quality deterioration due to flame or heat, take adequate steps for protection such as (1) by shielding with a metal plate, (2) by using a wet cloth, and (3) by means of heat absorbent.

4. Movement during Brazing
   Eliminate all vibration during brazing to protect brazed joints from cracking and breakage.
5. Oxidation Preventative
   In order to improve the brazing efficiency, various types of antioxidant are available on the market. However, the constituents of these are widely varied, and some are anticipated to corrode the piping materials, or adversely affect HFC refrigerant, lubricating oil, etc. Exercise care when using an oxidation preventive.

11.4.7. Servicing Tips

The drier must also be replaced whenever replacing the refrigerant cycle parts. Replacing the refrigerant cycle parts first before replacing the drier. The drier is supplied in a vacuum pack. Perform brazing immediately after opening the vacuum pack, and then start the vacuum within two hours. In addition, the drier also needs to be replaced when the refrigerant has leaked completely.

12. Servicing Information

Caution:

- Pb free solder has a higher melting point than standard solder; Typically the melting point is 50
  (30 - 40°C) higher. Please use a high temperature soldering iron. In case of the soldering iro
  temperature control, please set it to 700 ± 20°F (370 ± 10°C).
- Pb free solder will tend to splash when heated too high (about 1100° F/600°C).

12.1. Indoor Electronic Controllers Removal Procedures

1. The Electronic Controller, a Signal Receiver and an Indicator (Fig. 3) can be seen by the below steps:

   - Remove the 2 caps and 2 screws at the bottom of the Front Grille. (Fig. 1)

   - Remove the Front Grille by releasing the 2 hooks at the top of the Front Grille. (Fig. 1)

- **Remove the Control Board Cover by releasing the 2 tabs at left, 1 tab on top and 1 tab at right side of the Control Board Cover. (Fig. 2)**

2. To remove the Electronic Controller:

- **Release the Particular Piece. (Fig. 3)**
- **Release the hook that hold the Electronic Controller. (Fig. 3)**

Fig. 1

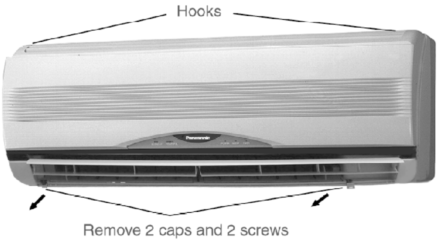

Hooks
Remove 2 caps and 2 screws

Fig. 2

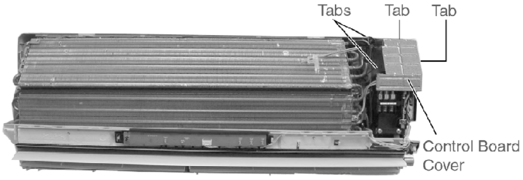
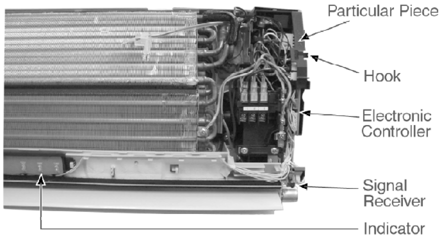

Tabs
Tab
Tab
Control Board Cover

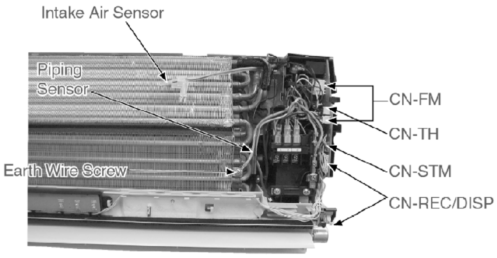
Fig. 3


Particular Piece
Hook
Electronic Controller
Signal Receiver
Indicator

12.2. Indoor Fan Motor and Cross Flow Fan Removal Procedures

- **Remove the Control Board by:-**
- **Releasing CN-REC/DISP connectors. (Fig. 4)**
- **Releasing CN-FM connectors. (Fig. 4)**
- **Releasing CN-STM connector. (Fig. 4)**
- **Removing the Earth Wire screw. (Fig. 4)**
- **Releasing the Intake Air Sensor. (Fig. 4)**
- **Releasing the Piping Sensor. (Fig. 4)**

Fig. 4


Intake Air Sensor
Piping Sensor
Earth Wire Screw
CN-FM
CN-TH
CN-STM
CN-REC/DISP

- **Pulling out the Drain Hose from outlet to remove the Discharge Grille. (Fig. 5)**
- **Removing the right and left screws. (Fig. 5)**
- **Then remove the Control Board by pressing down the hook at the left and pushing up the right hook. (Fig. 5)**
- **Release the Fan Motor leadwire by pressing the hook at the center of the connector. (Fig. 6)**
- **Remove the screw at the Cross Flow Fan. (Fig. 7)**
- **REMINDER - To reinstall the Fan Motor, adjust the connector of the Fan Motor as shown in the Fig. 7.**

Fig. 5

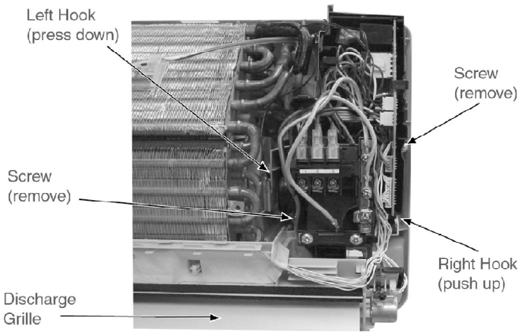

Left Hook
(press down)
Screw
(remove)
Screw
(remove)
Right Hook
(push up)
Discharge
Grille

Fig. 6

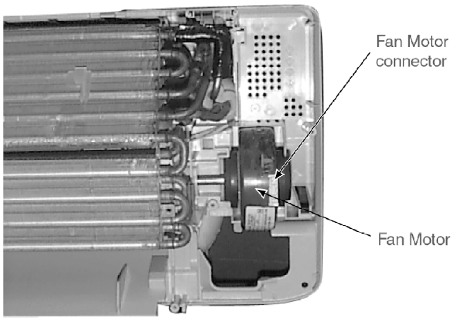
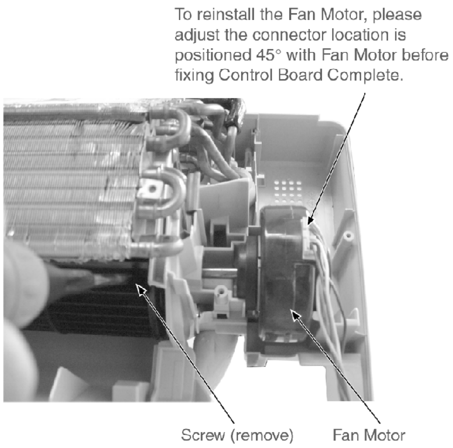

Fan Motor
connector
Fan Motor

Fig. 7


To reinstall the Fan Motor, please adjust the connector location is positioned 45° with Fan Motor before fixing Control Board Complete.
Screw (remove)
Fan Motor

- Remove the screws at the left of the Evaporator. (Fig. 8)
- Remove the Bearing. (Fig. 9)
- Push up the Evaporator and pull out the Cross Flow Fan from shaft. By then, Fan Motor can be taken out. (Fig. 9)

Fig. 8

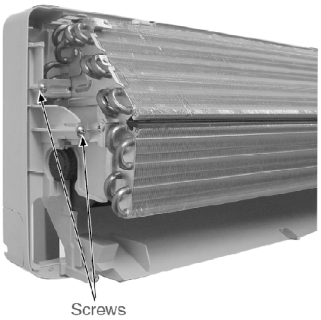
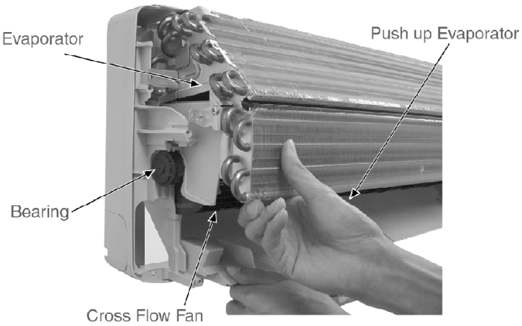


Fig. 9


Evaporator
Push up Evaporator
Bearing
Cross Flow Fan

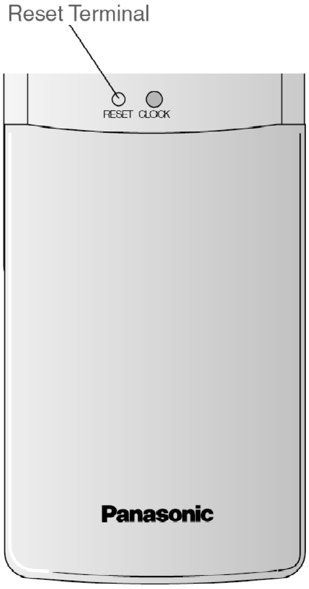
- Remote Control Reset

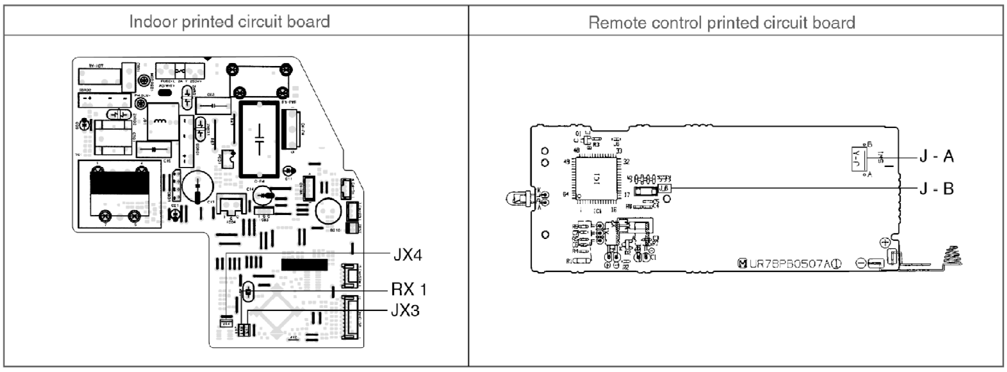
  When the batteries are inserted for the first time, or the batteries are replaced, all the indications will blink and the remote control might not work.

  If this happen, remove the cover of the remote control and you will find a resetting terminal, and by shorting it with a minus

screwdriver, it will return to normal.

- **Changing the wireless remote control transmission code**
  When two indoor units are installed in the same room, in order to prevent operating errors caused by using two remote controls, cut a jumper wire at the remote control printed circuit board (J - A) and cut a jumper wire at the indoor printed circuit board (JX4). It is possible to select from 4 types of transmission codes including one at time of delivery condition (0).


Reset Terminal
RESET
CLOCK
Panasonic


Indoor printed circuit board
Remote control printed circuit board
JX4
RX 1
JX3
J - A
J - B

	Remote control printed circuit board		Indoor printed circuit board			Note
	J - A	J - B	JX3	JX4	RX 1	
0	SHORT	OPEN	SHORT	SHORT	——	At product delivery
1	OPEN	OPEN	SHORT	OPEN	——	
2	SHORT	SHORT	OPEN	OPEN	10 KΩ	
3	OPEN	SHORT	SHORT	OPEN	10 KΩ	

13. Troubleshooting Guide

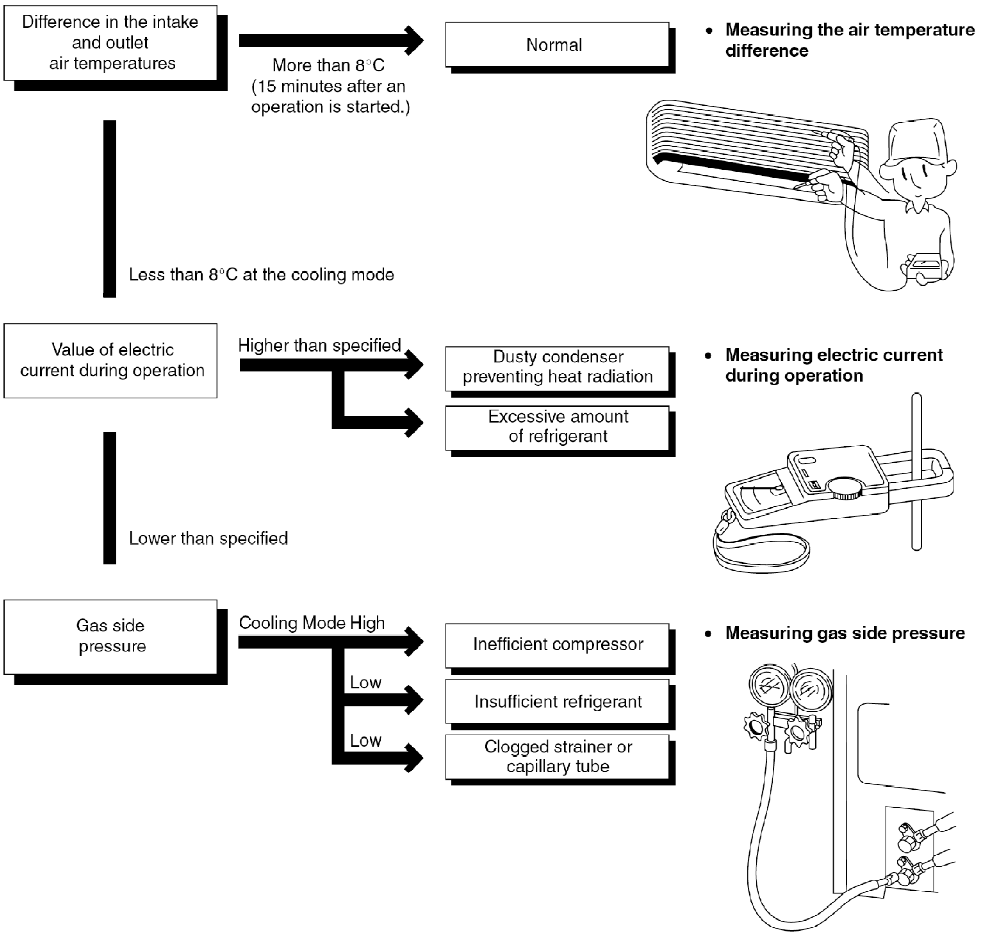
13.1. Refrigeration cycle system

In order to diagnose malfunctions, make sure that there are no electrical problems before inspecting the refrigeration cycle. Such problems include insufficient insulation, problem with the power source, malfunction of a compressor and a fan.
The normal outlet air temperature and pressure of the refrigeration cycle depends on various conditions, the standard values for them are shown in the table on the right.

Normal Pressure and Outlet Air Temperature (Standard)

	Gas pressure Mpa (kg/cm²G)	Outlet air temperature (°C)
Cooling Mode	0.9 ~ 1.2 (9 ~ 12)	12 ~ 16

* Condition: Indoor fan speed; High
Outdoor temperature: 35°C


Difference in the intake and outlet air temperatures
More than 8°C (15 minutes after an operation is started.)
Normal
• Measuring the air temperature difference
Less than 8°C at the cooling mode
Value of electric current during operation
Higher than specified
Dusty condenser preventing heat radiation
Excessive amount of refrigerant
• Measuring electric current during operation
Lower than specified
Gas side pressure
Cooling Mode High
Inefficient compressor
Low
Insufficient refrigerant
Low
Clogged strainer or capillary tube
• Measuring gas side pressure

13.1.1. Relationship between the condition of the air conditioner and pressure and electric current

Condition of the air conditoner	Cooling Mode		
	Low Pressure	High Pressure	Electric current operatio
Insufficient refrigerant (gas leakage)	↘	↘	↘
Clogged capillary tube or Strainer	↘	↘	↘
Short circuit in the indoor unit	↘	↘	↘
Heat radiation deficiency of the outdoor unit	↗	↗	↗
Inefficient compression	↗	↘	↘

- Carry out the measurements of pressure, electric current, and temperature fifteen minutes after an operation is started.

13.1.2. Diagnosis methods of a malfunction of a compressor

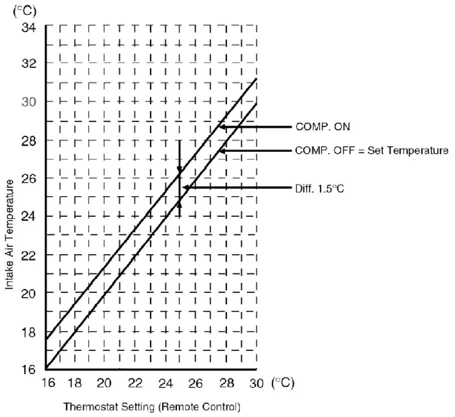
Nature of fault	Symptom
Insufficient compressing of a compressor	-Electric current during operation becomes approximately 20% lower than the normal va -The discharge tube of the compressor becomes abnormally hot (normally 70 to 90°C). -The difference between high pressure and low pressure becomes almost zero.
Locked compressor	-Electric current reaches a high level abnormally, and the value exceeds the limit of an a some cases, a breaker turns off. -The compressor has a humming sound.

14. Technical Data

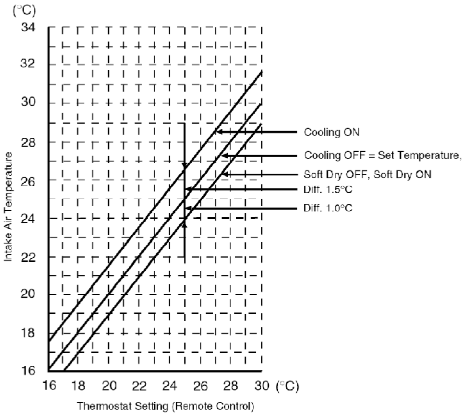
■ Thermostat characteristics

CS-V7BK / CS-V9BK / CS-V12BK

- **Cooling**

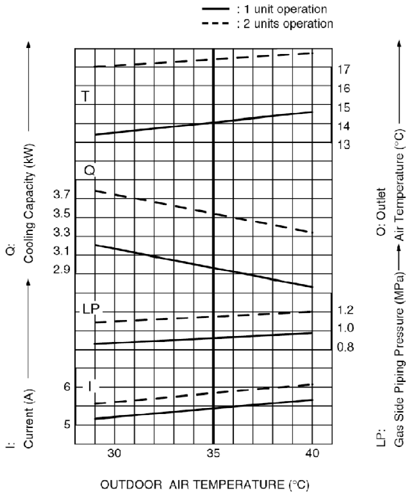


- **Soft Dry**



■ Operation characteristics

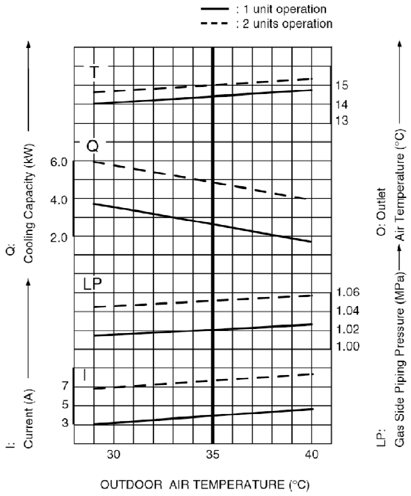
CS-V9BK / CU-2V14BK



[Condition] Room temperature: 27/19°C
Cooling operation: At High fan
Piping length: 7 m
At 230V

CS-V9BK / CU-2V18BK

The capability value shown is the value for one unit.
For a total for two units, multiply by 2.

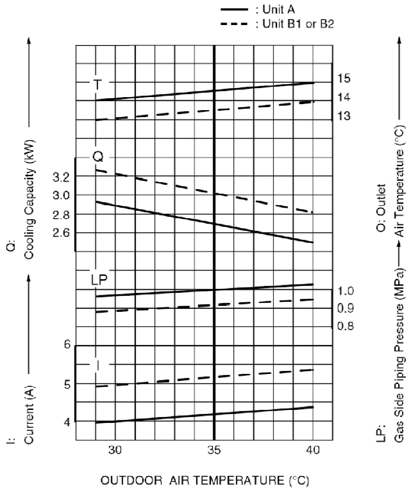


[Condition] Room temperature: 27/19°C
Cooling operation: At High fan
Piping length: 7 m
At 230V

■ Operation characteristics

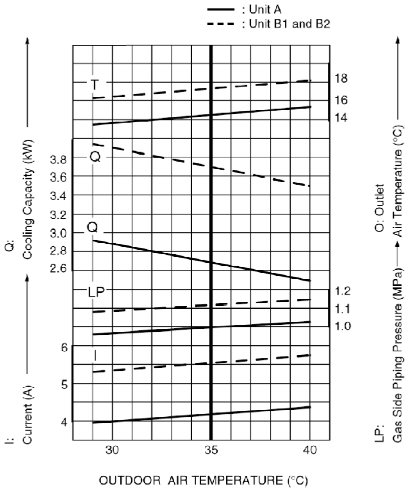
CS-V9BK / CU-3V20BK

- **1 Unit Operation**



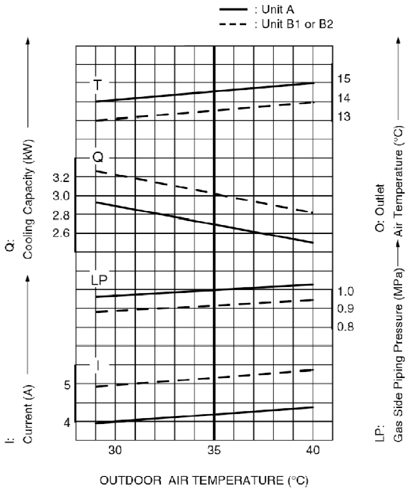
[Condition] Room temperature: 27/19°C
Cooling operation: At High fan
Piping length: 7 m
At 230V

- **3 Units Operation**



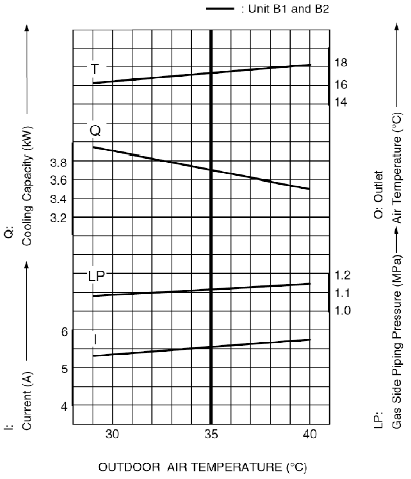
[Condition] Room temperature: 27/19°C
Cooling operation: At High fan
Piping length: 7 m
At 230V

- **2 Units Operation (A + B1 or B2)**



[Condition] Room temperature: 27/19°C
Cooling operation: At High fan
Piping length: 7 m
At 230V

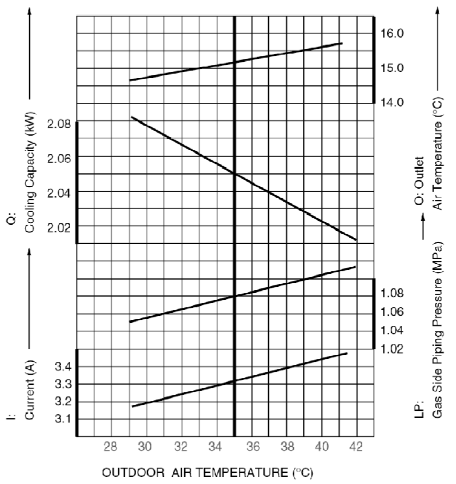
- **2 Units Operation (B1 + B2)**



[Condition] Room temperature: 27/19°C
Cooling operation: At High fan
Piping length:7 m
At 230V

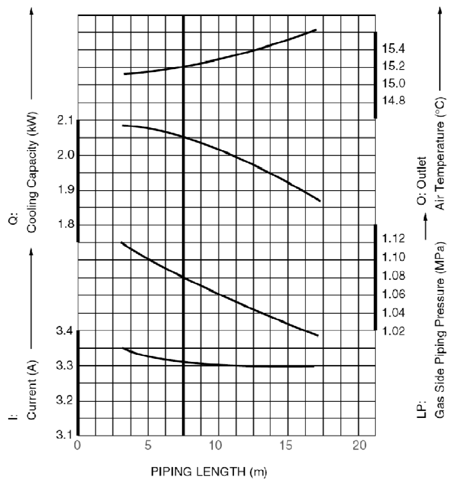
CS-V7BK / CU-2V19BK

- **Cooling Characteristic**



[Condition] Room temperature: 27/19°C
Cooling operation: At High fan
Piping length: 7.5 m
At 230V

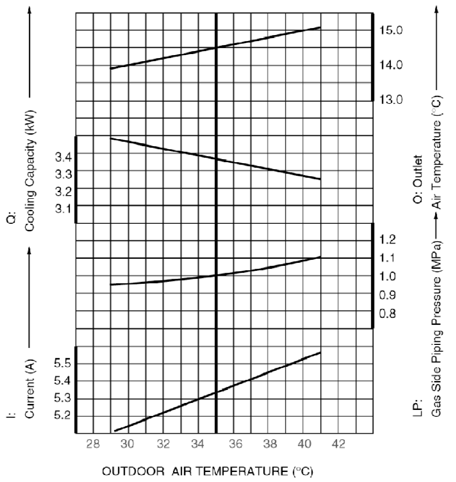
- **Piping Length Characteristic**



[Condition] Room temperature: 27/19°C
Cooling operation: At High fan
Outdoor temperature: 35/24°C
At 230V

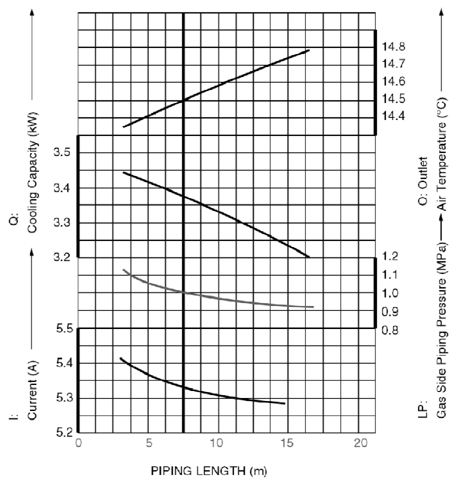
CS-V12BK / CU-2V19BK

- **Cooling Characteristic**



[Condition] Room temperature: 27/19°C
Cooling operation: At High fan
Piping length: 7.5 m
At 230V

- **Piping Length Characteristic**



[Condition] Room temperature: 27/19°C
Cooling operation: At High fan
Outdoor temperature: 35/24°C
At 230V

■ Sensible Capacity Chart

- **CS-V9BK / CU-2V14BK (1 unit)**

230V	Outdoor Temp. (°C)											
Indoor wet bulb temp.	30			35			40			46		
	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP
17.0°C	2.98	2.26	1.08	2.78	2.16	1.16	2.59	2.08	1.24	2.35	1.98	1.34
19.0°C				3.00		1.18						
19.5°C	3.27	2.36	1.10	3.05	2.27	1.18	2.84	2.18	1.27	2.58	2.08	1.37
22.0°C	3.56	2.45	1.12	3.33	2.36	1.21	3.10	2.27	1.29	2.81	2.17	1.39

- **CS-V9BK / CU-2V14BK (2 units)**

230V	Outdoor Temp. (°C)											
Indoor wet bulb temp.	30			35			40			46		
	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP
17.0°C	3.67	2.78	1.14	3.43	2.67	1.22	3.19	2.56	1.31	2.90	2.44	1.41
19.0°C				3.70		1.24						
19.5°C	4.03	2.91	1.16	3.77	2.80	1.24	3.50	2.69	1.33	3.19	2.56	1.44
22.0°C	4.39	3.02	1.18	4.10	2.91	1.27	3.82	2.80	1.36	3.47	2.67	1.46

- **CS-V9BK / CU-2V18BK (1 unit)**

230V	Outdoor Temp. (°C)											
Indoor wet bulb temp.	30			35			40			46		
	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP
17.0°C	2.71	2.05	0.79	2.53	1.97	0.85	2.35	1.89	0.91	2.14	1.80	0.98
19.0°C				2.73		0.86						
19.5°C	2.97	2.15	0.80	2.78	2.06	0.86	2.59	1.99	0.92	2.35	1.89	1.00
22.0°C	3.24	2.23	0.82	3.03	2.14	0.88	2.82	2.07	0.94	2.56	1.97	1.01

- **CS-V9BK / CU-2V18BK (2 units)**

230V	Outdoor Temp. (°C)											
Indoor wet bulb temp.	30			35			40			46		
	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP
17.0°C	5.42	4.11	1.58	5.06	3.94	1.69	4.71	3.78	1.81	4.28	3.60	1.96
19.0°C				5.46		1.72						
19.5°C	5.95	4.30	1.60	5.56	4.13	1.73	5.17	3.98	1.85	4.70	3.78	1.99
22.0°C	6.48	4.46	1.63	6.06	4.29	1.76	5.63	4.14	1.88	5.12	3.94	2.03

- **CS-V9BK / CU-3V20BK (A unit)**

230V	Outdoor Temp. (°C)											
Indoor wet bulb temp.	30			35			40			46		
	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP
17.0°C	2.71	2.05	0.83	2.53	1.97	0.90	2.35	1.89	0.96	2.14	1.80	1.03
19.0°C				2.73		0.91						
19.5°C	2.97	2.15	0.85	2.78	2.06	0.91	2.59	1.99	0.98	2.35	1.89	1.05
22.0°C	3.24	2.23	0.86	3.03	2.14	0.93	2.82	2.07	0.99	2.56	1.97	1.07

- **CS-V9BK / CU-3V20BK (B1 or B2 unit)**

230V	Outdoor Temp. (°C)											
Indoor wet bulb temp.	30			35			40			46		
	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP
17.0°C	2.93	2.22	1.03	2.73	2.13	1.10	2.54	2.04	1.18	2.31	1.94	1.27
19.0°C				2.95		1.12						
19.5°C	3.21	2.32	1.04	3.00	2.23	1.12	2.79	2.15	1.20	2.54	2.04	1.30
22.0°C	3.50	2.41	1.06	3.27	2.32	1.14	3.04	2.23	1.22	2.77	2.13	1.32

- **CS-V9BK / CU-3V20BK (B1 + B2 units)**

230V	Outdoor Temp. (°C)											
Indoor wet bulb temp.	30			35			40			46		
	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP
17.0°C	3.79	2.87	1.10	3.54	2.76	1.18	3.29	2.65	1.26	2.99	2.52	1.36
19.0°C				3.82		1.20						
19.5°C	4.16	3.01	1.12	3.89	2.89	1.20	3.62	2.78	1.29	3.29	2.65	1.39
22.0°C	4.53	3.12	1.14	4.24	3.00	1.23	3.94	2.89	1.31	3.58	2.76	1.41

- **CS-V9BK / CU-3V20BK (A + B1 or B2 units)**

230V	Outdoor Temp. (°C)											
Indoor wet bulb temp.	30			35			40			46		
	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP
17.0°C	5.63	4.27	1.78	5.27	4.10	1.91	4.90	3.94	2.04	4.45	3.74	2.21
19.0°C				5.68		1.94						
19.5°C	6.19	4.47	1.81	5.78	4.30	1.95	5.38	4.14	2.08	4.89	3.94	2.25
22.0°C	6.74	4.64	1.84	6.30	4.46	1.98	5.86	4.30	2.12	5.33	4.10	2.29

- **CS-V9BK / CU-3V20BK (A + B1 + B2 units)**

230V	Outdoor Temp. (°C)											
Indoor wet bulb temp.	30			35			40			46		
	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP
17.0°C	6.50	4.93	1.82	6.07	4.72	1.96	5.65	4.54	2.10	5.14	4.31	2.26
19.0°C				6.55		1.99						
19.5°C	7.13	5.16	1.86	6.67	4.95	2.00	6.20	4.77	2.14	5.64	4.54	2.30
22.0°C	7.77	5.35	1.89	7.26	5.14	2.03	6.76	4.96	2.18	6.14	4.73	2.35

- **CS-V12BK / CU-2V19BK (A unit)**

230V	Outdoor Temp. (°C)											
Indoor wet bulb temp.	30			35			40			46		
	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP
17.0°C	3.52	2.67	1.13	3.29	2.56	1.21	3.06	2.46	1.30	2.78	2.34	1.40
19.0°C				3.55		1.23						
19.5°C	3.87	2.80	1.15	3.61	2.69	1.23	3.36	2.59	1.32	3.06	2.46	1.42
22.0°C	4.21	2.90	1.17	3.94	2.79	1.26	3.66	2.69	1.34	3.33	2.56	1.45

- **CS-V7BK / CU-2V19BK (B unit)**

230V	Outdoor Temp. (°C)											
Indoor wet bulb temp.	30			35			40			46		
	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP
17.0°C	2.08	1.58	0.66	1.95	1.51	0.71	1.81	1.46	0.76	1.65	1.38	0.82
19.0°C				2.10		0.72						
19.5°C	2.29	1.65	0.67	2.14	1.59	0.72	1.99	1.53	0.77	1.81	1.46	0.83
22.0°C	2.49	1.71	0.68	2.33	1.65	0.74	2.17	1.59	0.79	1.97	1.52	0.85

- **CS-V12BK, CS-V7BK / CU-2V19BK (A + B units)**

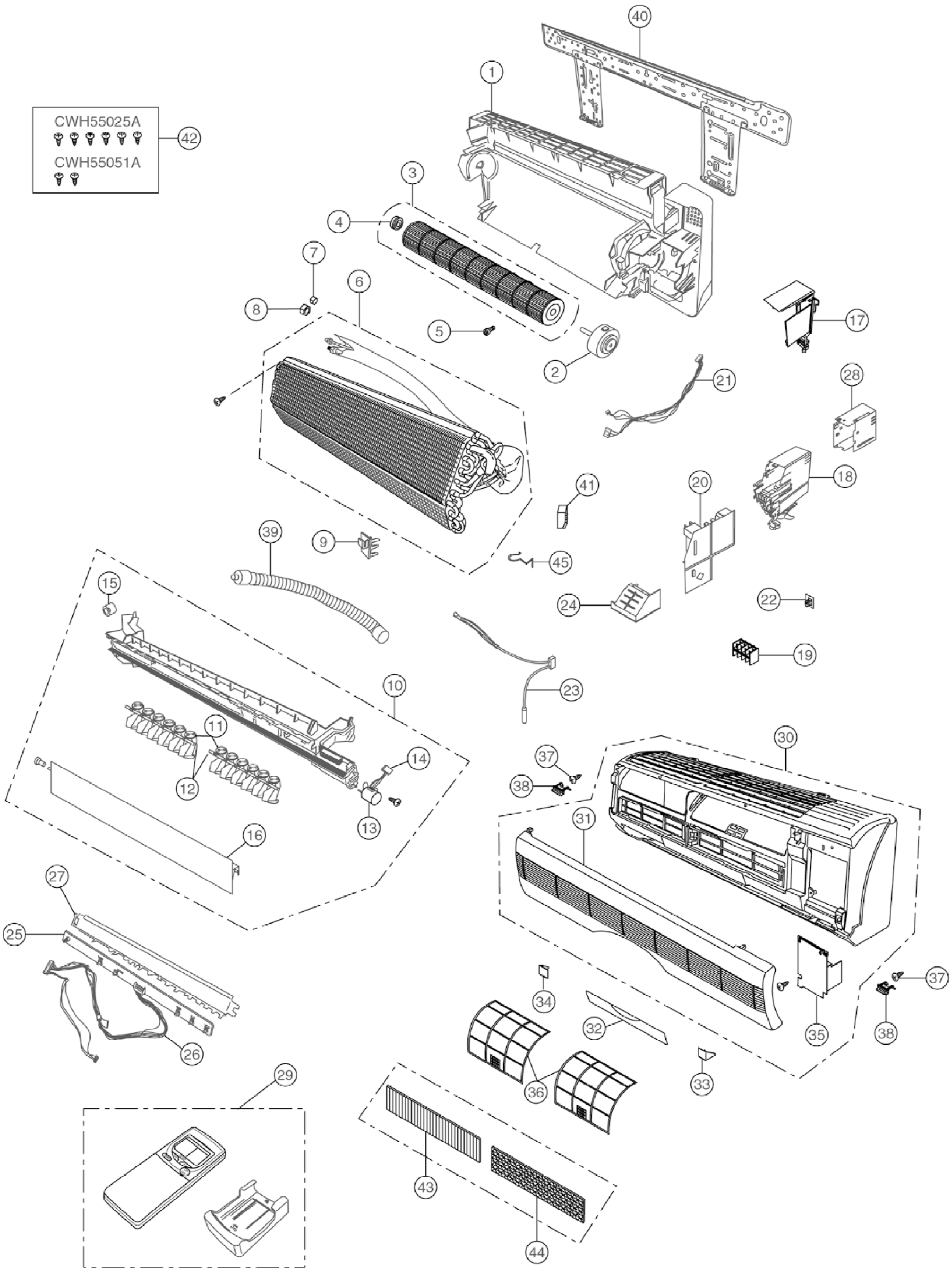
230V	Outdoor Temp. (°C)											
Indoor wet bulb temp.	30			35			40			46		
	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP
17.0°C	5.60	4.25	1.69	5.24	4.07	1.82	4.87	3.92	1.95	4.43	3.72	2.10
19.0°C				5.65		1.85						
19.5°C	6.15	4.45	1.73	5.75	4.27	1.86	5.35	4.11	1.99	4.86	3.92	2.14
22.0°C	6.71	4.61	1.76	6.27	4.44	1.89	5.83	4.28	2.02	5.30	4.08	2.18

TC - Total Cooling (kW)
SHC - Sensible Heat Capacity (kW)
IP - Input Power (kw)

Indoor 27°C/19°C
Outdoor 35°C/24°C

15. Exploded View

CS-V7BK / CS-V9BK / CS-V12BK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CWH55025A
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Note:
The above exploded view is for the purpose of parts disassembly and replacement.
The non-numbered parts are not kept as standard service parts.

16. Replacement Parts List

<Model: CS-V7BKPG / CS-V9BKPG / CS-V12BKPG>

REF. NO.	PART NAME & DESCRIPTION	QTY.	CS-V7BKPG	CS-V9BKPG	C
1	CHASSY COMPLETE	1	CWD50C1231	←	
2	FAN MOTOR	1	CWA921060	←	
3	CROSS FLOW FAN COMPLETE	1	CWH02C1012	←	
4	BEARING ASS'Y	1	CWH64K007	←	
5	SCREW - CROSS FLOW FAN	1	CWH4580304	←	
6	EVAPORATOR	1	CWB30C1143	←	C
7	FLARE NUT	1	CWH6002140(1/4")	←	
8	FLARE NUT	1	CWT25005 (3/8")	←	CW
9	INTAKE AIR SENSOR HOLDER	1	CWH32142	←	
10	DISCHARGE GRILLE COMPLETE	1	CWE20C2101	←	
11	VERTICAL VANE	12	CWE241068	←	
12	CONNECTING BAR	2	CWE261024	←	
13	AIR SWING MOTOR	1	CWA98259	←	
14	LEAD WIRE - AIR SWING MOTOR	1	CWA67C3977	←	
15	CAP - DRAIN TRAY	1	CWH52C1001	←	
16	HORIZONTAL VANE	1	CWE241070	←	
17	PARTICULAR PIECE	1	CWD932162	←	
18	CONTROL BOARD	1	CWH102103	←	
19	TERMINAL BOARD COMPLETE	1	CWA28C2082	←	
20	ELECTRONIC CONTROLLER - MAIN	1	CWA742779	CWA742780	C
21	LEAD WIRE - FAN MOTOR	1	CWA67C3729	←	
22	ELECTRONIC CONTROLLER - RECEIVER	1	CWA73C1124	←	
23	SENSOR COMPLETE	1	CWA50C608	←	
24	CONTROL BOARD FRONT COVER	1	CWH131090	←	
25	ELECTRONIC CONTROLLER - INDICATOR	1	CWE39C1063	←	
26	LEAD WIRE - INDICATOR	1	CWA67C3724	←	
27	INDICATOR HOLDER	1	CWD932163	←	
28	CONTROL BOARD TOP COVER	1	CWH131091	←	
29	REMOTE CONTROL COMPLETE	1	CWA75C2161	←	
30	FRONT GRILLE COMPLETE	1	CWE11C2329	←	
31	INTAKE GRILLE	1	CWE221036	←	
32	CONTROL PANEL	1	CWE312114	←	
33	DECORATION BASE (R)	1	CWE351067	←	
34	DECORATION BASE (L)	1	CWE351068	←	
35	GRILLE DOOR	1	CWE141033	←	
36	AIR FILTER	2	CWD001047	←	
37	SCREW - FRONT GRILLE	2	XTN4+16C	←	
38	CAP - FRONT GRILLE	2	CWH521062	←	
39	DRAIN HOSE	1	CWH85287	←	
40	INSTALLATION PLATE	1	CWH36K1006	←	
41	ANTI-VIBRATION BUSHING	1	-	-	C
42	BAG COMPLETE - INSTALLATION SCREW	1	CWH82C067	←	
43	AIR PURIFYING FILTER	1	CWMD00C0001	←	

REF. NO.	PART NAME & DESCRIPTION	QTY.	CS-V7BKPG	CS-V9BKPG	C
44	SOLAR DEODORIZING FILTER	1	CWMD00C0002	←	
45	PIPE SENSOR HOLDER	1	CWH32143	←	

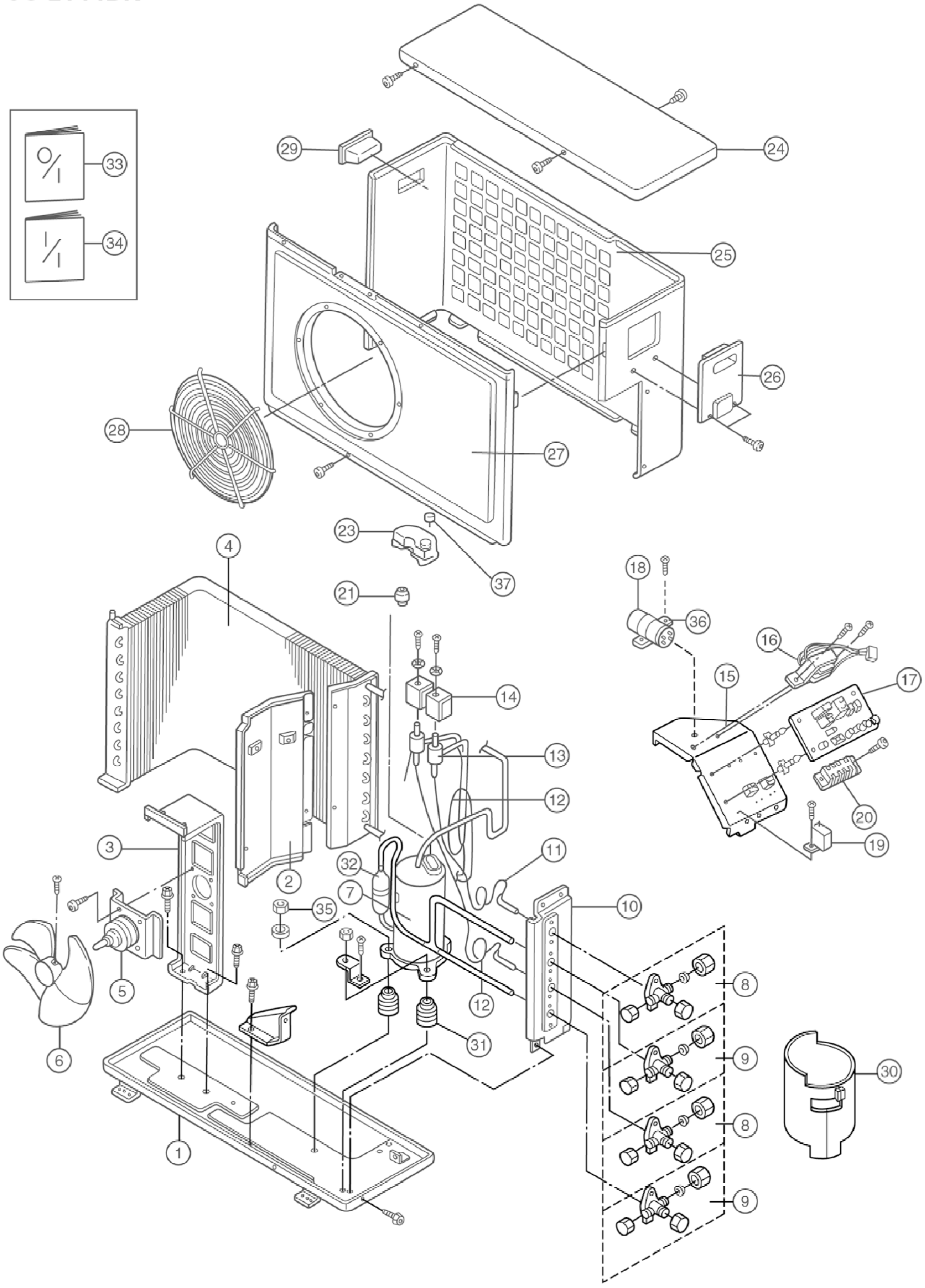
(Note)

- All parts are supplied from MAICO, Malaysia (Vendor Code: 061).

- “O” marked parts are recommended to be kept in stock.

17. Exploded View

CU-2V14BK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Note:

The above exploded view is for the purpose of parts disassembly and replacement.

The non-numbered parts are not kept as standard service parts.

18. Replacement Parts List

<Model: CU-2V14BKP5G>

NO.	DESCRIPTION & NAME	Q'TY	CU-2V14BKP5G	REMARKS
1	CHASSY ASS'Y	1	CWD50K573A	
2	SOUND PROOF BOARD	1	CWH15066	
3	FAN MOTOR BRACKET	1	CWD54168	
4	CONDENSER	1	CWB322215	
5	FAN MOTOR	1	CWA951202	0
6	PROPELLER FAN	1	CWH00022	
7	COMPRESSOR	1	GB134PAA	0
8	2-WAY VALVE (LIQUID SIDE)	2	CWB021085	0
9	3-WAY VALVE (GAS SIDE)	2	CWB011107	0
10	HOLDER COUPLING	1	CWH35075A	
11	CAPILLARY TUBE	1	CWB152161	
12	CAPILLARY TUBE	2	CWB152161	
13	2 WAY VALVE	1	CWB021078	
14	V - C0IL COMPLETE	1	CWA43C2090	0
15	CONTROL BOARD	1	CWH10967	
16	TRANSFORMER	1	CWA40C192	0
17	ELECTRONIC CONTROLLER	1	CWA741123	0
18	CAPACITOR - COMPRESSOR	1	F0GAH356A001 (400VAC, 35 μ F)	0
19	CAPACITOR - FAN MOTOR	1	CWA31709 (430VAC, 1 μ F)	0
20	TERMINAL BOARD	1	CWA28131	
21	OVERLOAD PROTECTOR	1	CWA121057	0
23	TERMINAL COVER - COMPRESSOR	1	CWH171021	
24	CABINET TOP PLATE	1	CWE03061A	
25	CABINET REAR PLATE	1	CWE02071A	
26	CONTROL BOARD COVER	1	CWH13236	
27	CABINET FRONT PLATE	1	CWE06C109A	
28	FAN GUARD	1	CWD04182	
29	HANDLE	1	CWE16000E	
30	SOUND - PROOF MATERIAL	1	CWG302143	
31	ANTI - VIBRATION BUSHING	3	CWH501024	
32	STRAINER	1	CWB11002	
33	OPERATING INSTRUCTION	1	CWF563539	
34	INSTALLATION INSTRUCTION	1	CWF612290	
35	NUT - COMPRESSOR	3	CWH4582065	
36	HOLDER CAPACITOR	1	CWH30060	
37	NUT TERMINAL COVER	1	CWH561020	

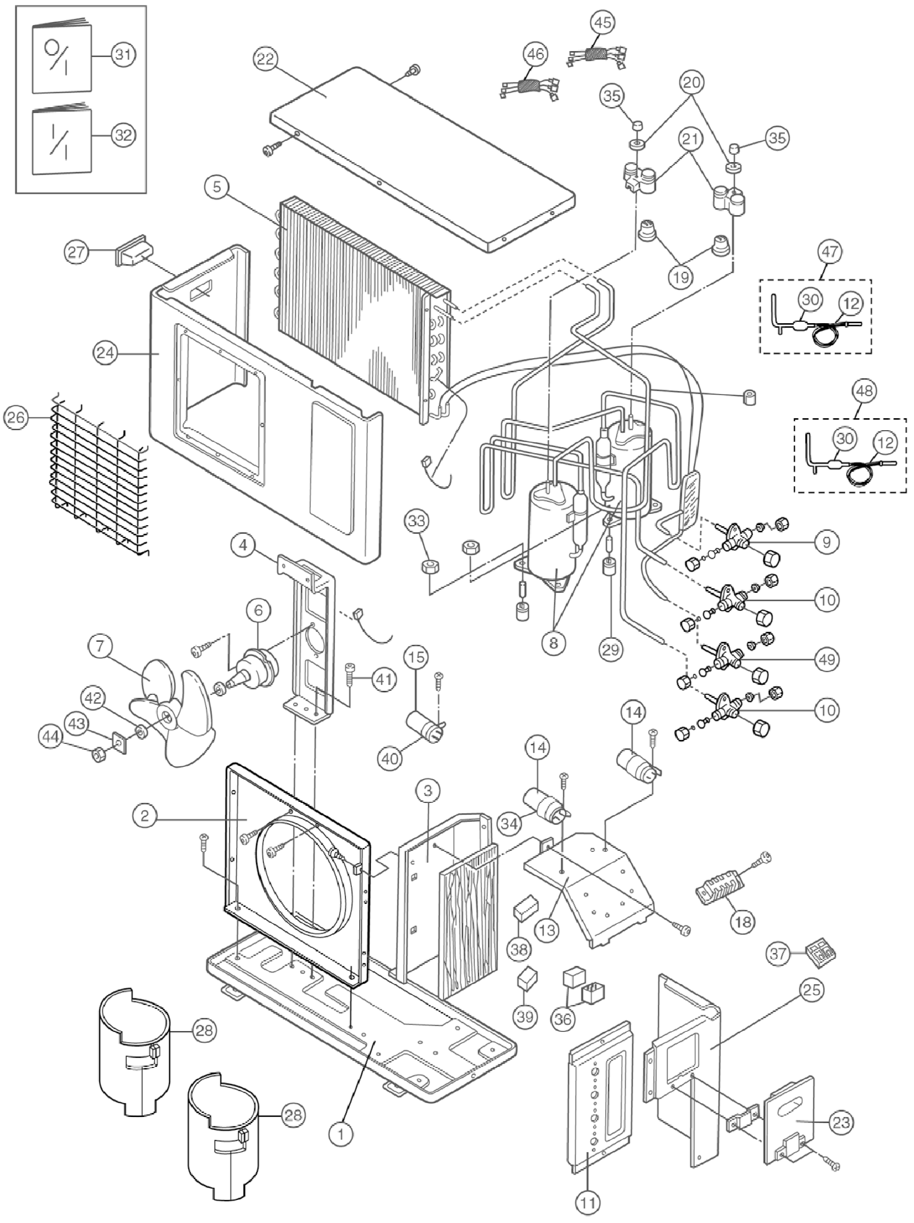
(Note)

- All parts are supplied from MAICO, Malaysia (Vendor Code: 061).

- "O" marked parts are recommended to be kept in stock.

19. Exploded View

CU-2V18BK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Note:
The above exploded view is for the purpose of parts disassembly and replacement.
The non-numbered parts are not kept as standard service parts.

20. Replacement Parts List

<Model: CU-2V18BKP5G>

NO.	DESCRIPTION & NAME	Q'TY	CU-2V18BKP5G	REMARKS
1	CHASSY ASS'Y	1	CWD50K663A	
2	AIR GUIDER FOR PROPELLER FAN	1	CWD31094A	
3	SOUND PROOF BOARD	1	CWH15071	
4	FAN MOTOR BRACKET	1	CWD54179	
5	CONDENSER	1	CWB322216	
6	FAN MOTOR	1	CWA951203	0
7	PROPELLER FAN	1	CWH00023	
8	COMPRESSOR	2	GB102PAB	0
9	2-WAY VALVE (LIQUID SIDE) (1/4")	1	CWB021086	0
10	3-WAY VALVE (GAS SIDE) (3/8")	2	CWB011107	0
11	HOLDER COUPLING	1	CWH35083A	
12	CAPILLARY TUBE	2	CWB152181	
13	CONTROL BOARD	1	CWH102151	
14	CAPACITOR - COMPRESSOR	2	DS371306CPNA (370VAC, 30 μ F)	0
15	CAPACITOR - FAN MOTOR	1	F0GAH305A002 (450VAC, 3 μ F)	0
18	TERMINAL BOARD	1	CWA281006	0
19	OVERLOAD PROTECTOR	2	CWA121059	0
20	WASHER - TERMINAL COVER	2	CWH571022	
21	TERMINAL COVER - COMPRESSOR	2	CWH171021	
22	CABINET TOP PLATE	1	CWE03C026	
23	CONTROL BOARD COVER	1	CWH13244	
24	CABINET FRONT PLATE	1	CWE06C110A	
25	CABINET SIDE PLATE	1	CWE04069A	
26	FAN GUARD	1	CWD04183	
27	HANDLE	1	CWE16000E	
28	SOUND - PROOF MATERIAL	2	CWG302141	
29	ANTI - VIBRATION BUSHING	6	CWH501024	
30	STRAINER	2	CWB11002	
31	OPERATING INSTRUCTION	1	CWF563539	
32	INSTALLATION INSTRUCTION	1	CWF612290	
33	NUT - COMPRESSOR	6	CWH56000	
34	HOLDER CAPACITOR - COMP.	2	CWH30078	
35	NUT TERMINAL COVER	2	CWH561020	
36	MAGNETIC RELAY	2	CWA4000088	
37	TERMINAL BOARD ASS'Y	1	CWA28K234	
38	TERMINAL BOARD	1	CWA4711012	
39	ELECTRONIC CONTROLLER	1	CWA742811	
40	HOLDER CAPACITOR - FAN	1	CWH301005	
41	SCREW - BRACKET FAN MOTOR	4	CWH55027	
42	WASHER - PROPELLER FAN	1	CWH57066	
43	WASHER - PROPELLER FAN	1	CWH57067	
44	NUT - PROPELLER FAN	1	CWH56033	
45	LEAD WIRE COMPLETE - COMPRESSOR	1	CWA67C4205	
46	LEAD WIRE COMPLETE - COMPRESSOR	1	CWA67C4206	
47	TUBE ASS'Y (STRAINER, CAP.)	1	CWT01C2480	
48	TUBE ASS'Y (STRAINER, CAP.)	1	CWT01C2481	
49	2-WAY VALVE (LIQUID SIDE)	1	CWB021087	O

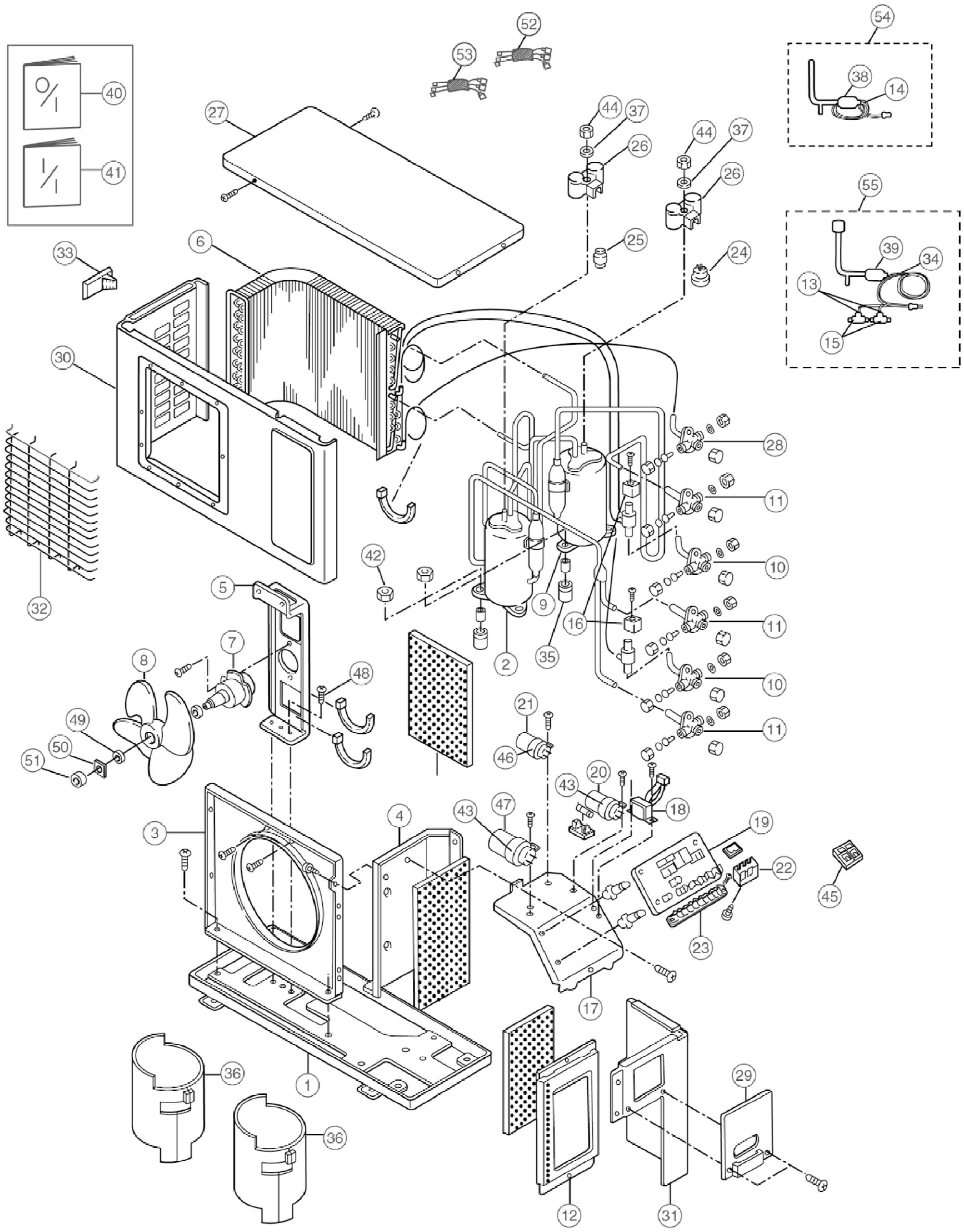
(Note)

- All parts are supplied from MAICO, Malaysia (Vendor Code: 061).

- “O” marked parts are recommended to be kept in stock.

21. Exploded View

CU-3V20BK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Note:
The above exploded view is for the purpose of parts disassembly and replacement.
The non-numbered parts are not kept as standard service parts.

22. Replacement Parts List

<Model: CU-3V20BKP5G>

NO.	DESCRIPTION & NAME	Q'TY	CU-3V20BKP5G	REMARKS
1	CHASSY ASS'Y	1	CWD50K663A	
2	COMPRESSOR	1	GB134PAB	0
3	AIR GUIDER	1	CWD31094A	
4	SOUND PROOF BOARD	1	CWH15071	
5	FAN MOTOR BRACKET	1	CWD54179	
6	CONDENSER	1	CWB322217	
7	FAN MOTOR	1	CWA951203	
8	PROPELLER FAN	1	CWH00023	
9	COMPRESSOR	1	GB102PAB	
10	2-WAY VALVE (LIQUID SIDE) (1/4")	2	CWB021088	0
11	3-WAY VALVE (GAS SIDE) (3/8")	3	CWB011107	0
12	HOLDER COUPLING	1	CWH35127A	
13	CAPILLARY TUBE	2	CWB152164	
14	CAPILLARY TUBE	1	CWB152162	
15	2-WAY VALVE	2	CWB021080	
16	V - COIL COMPLETE	1	CWA43C2091	0
17	CONTROL BOARD	1	CWH102151	0
18	TRANSFORMER	1	CWA40C192	0
19	ELECTRONIC CONTROLLER	1	CWA741165	0
20	CAPACITOR - COMPRESSOR	1	DS371356CPNA / (35 μF, 370VAC)	0
21	CAPACITOR - FAN MOTOR	1	F0GAH305A002 (3.0 μF, 450VAC)	0
22	TERMINAL BOARD	1	CWA4711012	
23	TERMINAL BOARD	1	CWA28064	
24	OVERLOAD PROTECTOR	1	CWA121057	0
25	OVERLOAD PROTECTOR	1	CWA121059	0
26	TERMINAL COVER - COMPRESSOR	2	CWH171021	
27	CABINET TOP PLATE	1	CWE03C026	
28	2-WAY VALVE (LIQUID SIDE)	1	CWB021085	0
29	CONTROL BOARD COVER	1	CWH13322	
30	CABINET FRONT PANEL	1	CWE06C111A	
31	CABINET SIDE PLATE	1	CWE04131A	
32	FAN GUARD	1	CWD04183	
33	HANDLE	1	CWE16037C	
34	CAPILLARY TUBE	1	CWB152163	
35	ANTI - VIBRATION BUSHING	6	CWH501024	
36	SOUND PROOF MATERIAL	2	CWG302141	
37	WASHER - TERMINAL COVER	2	CWH571022	
38	STRAINER	1	CWB11002	
39	STRAINER	1	CWB11004	
40	OPERATING INSTRUCTION	1	CWF563539	
41	INSTALLATION INSTRUCTION	1	CWF612290	
42	NUT - COMPRESSOR	6	CWH56000	
43	HOLDER CAPACITOR	2	CWH30078	
44	NUT - TERMINAL COVER	2	CWH561020	
45	TERMINAL BOARD ASS'Y	1	CWA28K234	
46	HOLDER CAPACITOR - FAN	1	CWH301005	
47	CAPACITOR - COMPRESSOR	1	DS371306CPNA (30 μF, 370VAC)	O
48	SCREW - BRACKET FAN MOTOR	4	CWH55027	

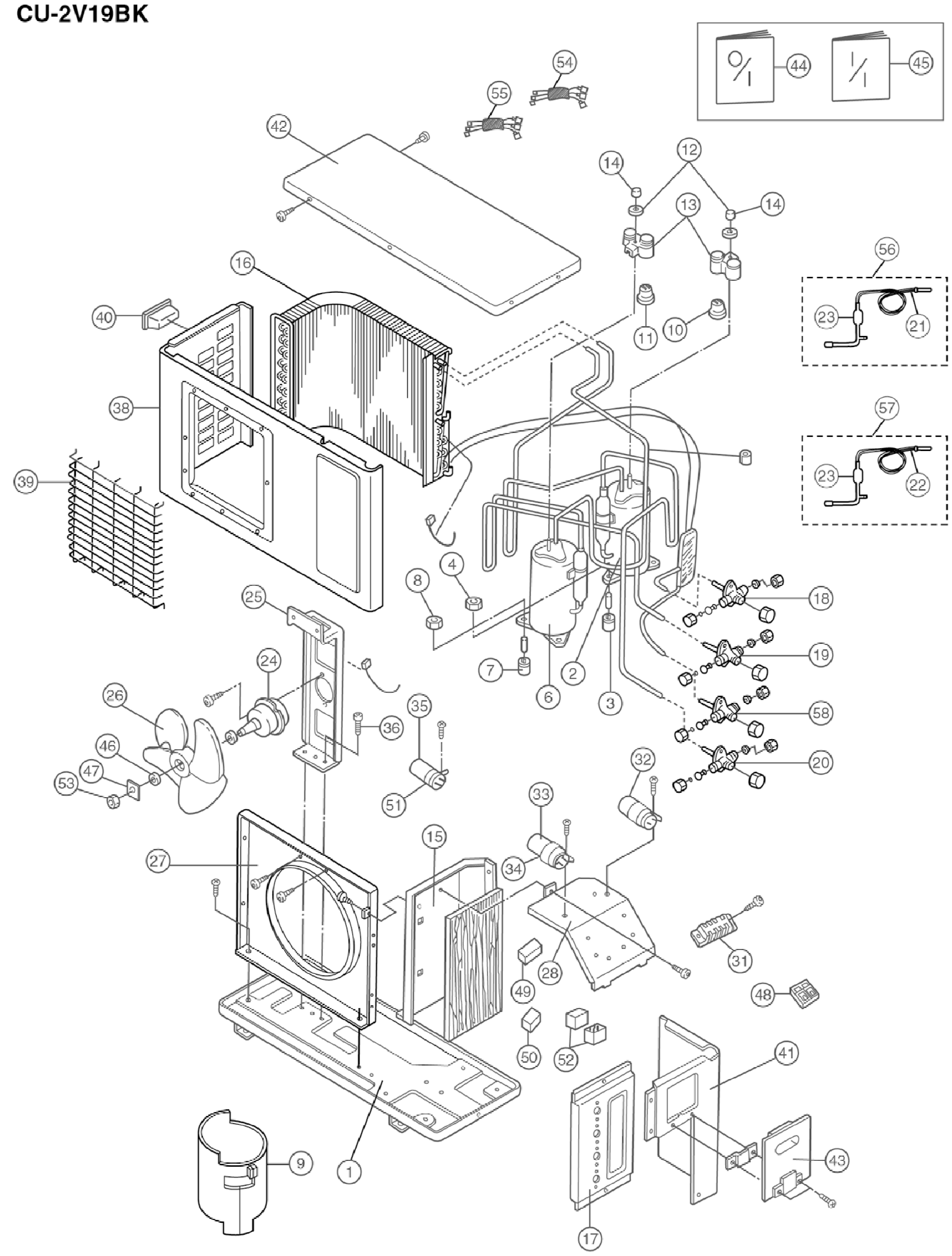
NO.	DESCRIPTION & NAME	Q'TY	CU-3V20BKP5G	REMARKS
49	WASHER - PROPELLER FAN	1	CWH57066	
50	WASHER - PROPELLER FAN	1	CWH57067	
51	NUT - PROPELLER FAN	1	CWH56033	
52	LEAD WIRE COMPLETE - COMPRESSOR	1	CWA67C4209	
53	LEAD WIRE COMPLETE - COMPRESSOR	1	CWA67C4205	
54	TUBE ASS'Y (STRAINER, CAP.)	1	CWT01C2485	
55	TUBE ASS'Y (STRAINER, CAP.)	1	CWT01C2486	

(Note)

- **All parts are supplied from MAICO, Malaysia (Vendor Code: 061).**
- **"O" marked parts are recommended to be kept in stock.**

23. Exploded View

CU-2V19BK


54
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43
9
1
17

Note:
The above exploded view is for the purpose of parts disassembly and replacement.
The non-numbered parts are not kept as standard service parts.

24. Replacement Parts List

<Model: CU-2V19BK>

NO.	DESCRIPTION & NAME	Q'TY	CU-2V19BKP5G	REMARKS
1	BASE ASS'Y	1	CWD50K2063A	
2	COMPRESSOR A	1	GB134PAB	0
3	MOUNT RUBBER	3	CWH501024	
4	NUT	3	CWH4582065	
6	COMPRESSOR B	1	GB080PAB	0
7	MOUNT RUBBER	3	CWH501024	
8	NUT	3	CWH56000	
9	SOUND PROOF MATERIAL	1	CWG302142	
10	OVERLOAD PROTECTOR A	1	CWA121057	0
11	OVERLOAD PROTECTOR B	1	CWA121058	0
12	WASHER - TERMINAL COVER	2	CWH571022	
13	TERMINAL COVER - COMP.	2	CWH171021	
14	NUT TERMINAL COVER	2	CWH561020	
15	SOUND PROOF PLATE	1	CWH15071	
16	CONDENSER	1	CWB322217	
17	COUPLING BRACKET	1	CWH35083A	
18	2-WAY VALVE (LIQUID SIDE) (1/4")	1	CWB021086	0
19	3-WAY VALVE (GAS SIDE) (3/8")	1	CWB011107	0
20	3-WAY VALVE (GAS SIDE) (1/2")	1	CWB011108	0
21	CAPILLARY TUBE	1	CWB152182	
22	CAPILLARY TUBE	1	CWB15303	
23	STRAINER	2	CWB11002	
24	FAN MOTOR	1	CWA951203	0
25	FAN MOTOR BRACKET	1	CWD54179	
26	PROPELLER FAN	1	CWH00023	
27	AIR GUIDER - P. FAN	1	CWD31094A	
28	CONTROL BOARD	1	CWH102151	
31	TERMINAL BOARD	1	CWA281006	
32	CAPACITOR - COMP. A (35 μ F, 370VAC)	1	DS371356CPNA	0
33	CAPACITOR - COMP. B (25 μ F, 370VAC)	1	CWA312075	0
34	HOLDER CAPACITOR	2	CWH30078	
35	CAPACITOR - FAN MOTOR (3.0 μ F, 450VAC)	1	F0GAH305A002	0
36	SCREW - BRACKET FAN MOTOR	4	CWH55027	0
38	CABINET FRONT PLATE	1	CWE06C111A	
39	FAN GUARD	1	CWD04183	
40	HANDLE	1	CWE16037C	
41	CABINET SIDE PLATE	1	CWE04069A	
42	CABINET TOP PLATE	1	CWE03C026	
43	CONTROL BOARD COVER	1	CWH13244	
44	OPERATING INSTRUCTION	1	CWF563539	
45	INSTALLATION INSTRUCTION	1	CWF612290	
46	WASHER - PROPELLER FAN	1	CWH57066	
47	WASHER - PROPELLER FAN	1	CWH57067	
48	TERMINAL BOARD ASS'Y	1	CWA28K234	
49	TERMINAL BOARD	1	CWA4711012	
50	ELECTRONIC CONTROLLER	1	CWA742811	
51	HOLDER CAPACITOR - FAN	1	CWH301005	
52	MAGNETIC RELAY	2	CWA4000088	
53	NUT - PROPELLER FAN	1	CWH56033	
54	LEAD WIRE COMPLETE - COMPRESSOR	1	CWA67C4205	
55	LEAD WIRE COMPLETE - COMPRESSOR	1	CWA67C4208	
56	TUBE ASS'Y (STRAINER, CAP.)	1	CWT01C2482	
57	TUBE ASS'Y (STRAINER, CAP.)	1	CWT01C2483	

NO.	DESCRIPTION & NAME	Q'TY	CU-2V19BKP5G	REMARKS
58	2-WAY VALVE (LIQUID SIDE) (1/4")	1	CWB021087	0

(Note)

- All parts are supplied from MAICO, Malaysia (Vendor Code: 061).

- "O" marked parts are recommended to be kept in stock.

25. Electronic Parts List

<Electronic Controller Part No.: CWA742779, CWA742780 & CWA742781>

SYMBOL	DESCRIPTION & NAME	PART NO.
BZ101	SOUND GENERATOR	A48040
C-FM	SH CAPACITOR	A31698
D08, D10, D11	DIODE	B0ACCK000005 (CWA742779 & C only)
DB01	DIODE	A54CS1VB20E
FUSE	FUSE	XBA2C20TR0
FUSE HOLDER	FUSE HOLDER	XCSCW012
IC01	INTEGRATED CIRCUIT	A52D0022GB34
IC02	INTEGRATED CIRCUIT	C3EBDG000021
IC03	INTEGRATED CIRCUIT	A52C040
IC04	INTEGRATED CIRCUIT	A52C114
IC05	INTEGRATED CIRCUIT	A52A2003GR2
L01	V-COIL	A431036
PC01	PHOTO COUPLER	A52LP620-G4
Q01, Q02, Q03	TRANSISTOR	B1GBCFGH0001
Q04, Q05, Q06	TRANSISTOR	A55C2412KTX
RY-PWR	ELECTRO MAGNETIC RELAY	K6B1AGA00077
SSR01	TYRISTOR	A56G3MC202PL
T01	TRANSFORMER	A401030
X01	RESONATOR	A45CSTS409MG
ZD1	DIODE	B0BC7R400003
ZNR01, ZNR03	DIODE	ERZVEAV511

(Note)

- All parts are supplied from MAICO, Malaysia (Vendor Code: 061)

26. Electronic Circuit Diagram

Fig. 1

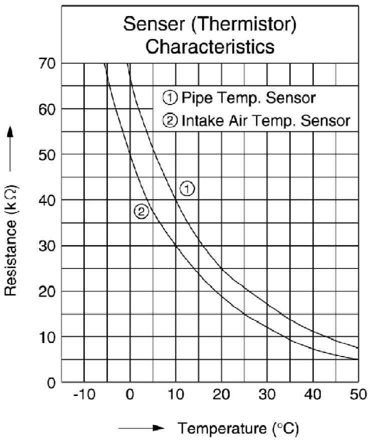


Fig. 2

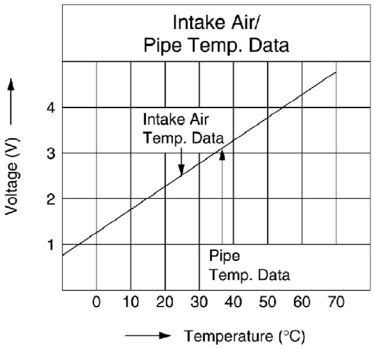
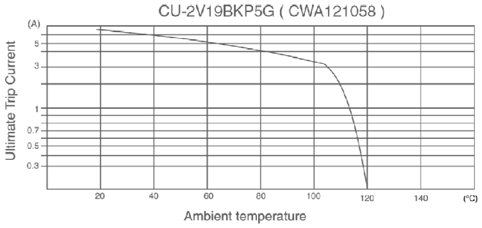
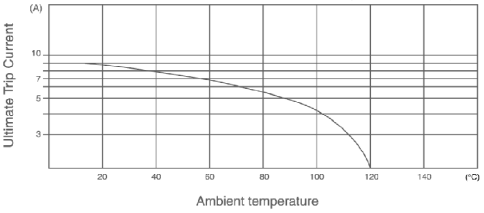


Fig. 3 OLP Characteristics (Compressor)

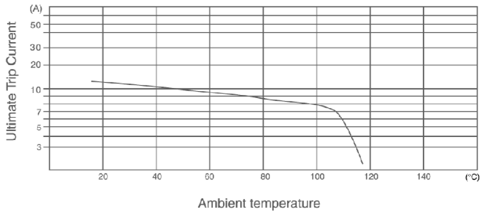
CU-2V19BKP5G (CWA121058)



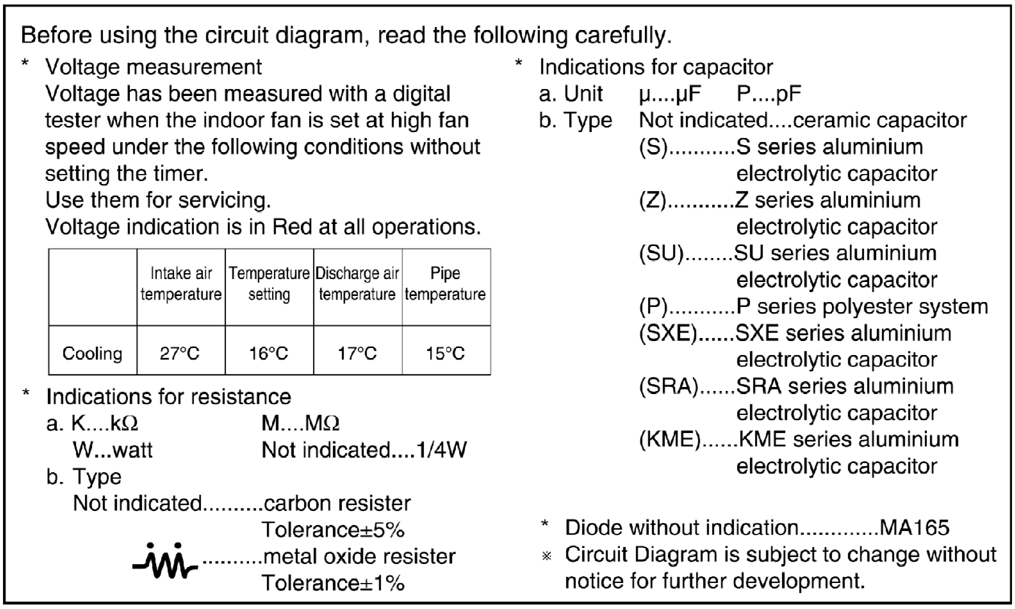
CU-2V18BKP5G, CU-3V20BKP5G (CWA121059)



CU-2V14BKP5G, CU-3V20BKP5G, , CU-2V19BKP5G (CWA121057)



How to use electronic circuit diagram



Before using the circuit diagram, read the following carefully.

* Voltage measurement
Voltage has been measured with a digital tester when the indoor fan is set at high fan speed under the following conditions without setting the timer.
Use them for servicing.
Voltage indication is in Red at all operations.

	Intake air temperature	Temperature setting	Discharge air temperature	Pipe temperature
Cooling	27°C	16°C	17°C	15°C

* Indications for resistance
a. K....kΩ M....MΩ
W...watt Not indicated....1/4W
b. Type
Not indicated..........carbon resister
Tolerance±5%
..........metal oxide resister
Tolerance±1%

* Indications for capacitor
a. Unit μ....μF P....pF
b. Type Not indicated....ceramic capacitor
(S)...........S series aluminium electrolytic capacitor
(Z)...........Z series aluminium electrolytic capacitor
(SU)........SU series aluminium electrolytic capacitor
(P)...........P series polyester system
(SXE)......SXE series aluminium electrolytic capacitor
(SRA)......SRA series aluminium electrolytic capacitor
(KME)......KME series aluminium electrolytic capacitor

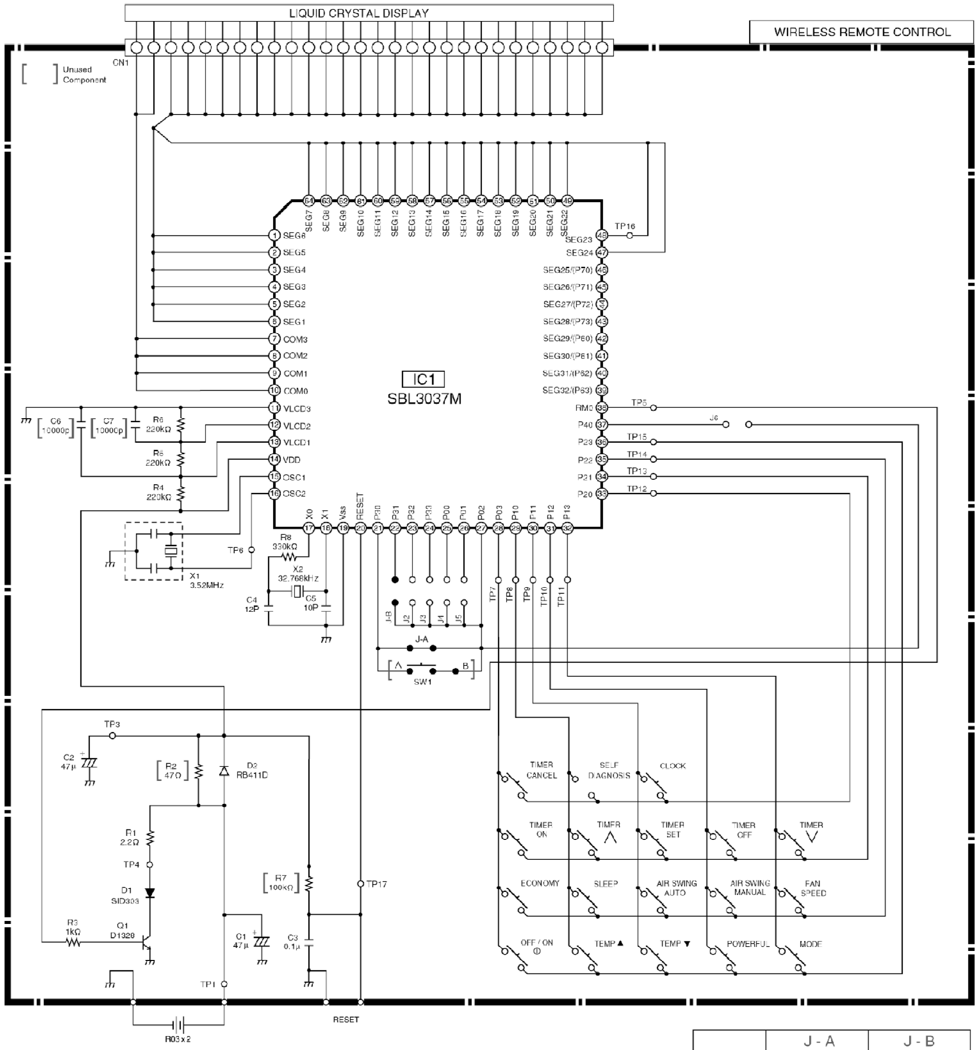
* Diode without indication.............MA165
※ Circuit Diagram is subject to change without notice for further development.

TIMER TABLE

Name		**Time**	**Test Mode (When test point Short-circuited)**	**Remarks**
Sleep Mode Waiting		**1 hr.**	**6 sec.**	
Sleep Mode Operation		**8 hrs.**	**48 sec.**	
Real Timer		**1 hr.**	**1 min.**	
		10 min.	**10 sec.**	
		1 min.	**1 sec.**	
Time Delay Safety Control		**2 min. 58 sec.**	**0 sec.**	
Forced Operation		**60 sec.**	**0 sec.**	
Time Save Control		**7 min.**	**4.2 sec.**	
Anti-Freezing		**4 min.**	**0 sec.**	
Auto Mode Judgement		**25 sec.**	**0 sec.**	
Soft Dry	**OFF**	**6 min.**	**36 sec.**	
	ON	**10 min.**	**60 sec.**	**Soft Dry: 10 min. operation**
Deodorizing Control	**Cooling**	**40 sec.**	**4 sec.**	
		70 sec.	**7 sec.**	
		20 sec.	**2 sec.**	
		180 sec.	**18 sec.**	
	Soft Dry	**40 sec.**	**4 sec.**	
		360 sec.	**36 sec.**	
Comp. Reverse Rotation Detection		**5 min.**	**30 sec.**	**Comp. ON 5 min. and above**
		2 min.	**0 sec.**	
Comp./ Fan Motor Delay Timer		**1.6 sec.**	**0 sec.**	
Powerful Mode Operation		**15 min.**	**15 sec.**	

Random FM Timer (Economy Mode)	**5 sec.**	**5 sec.**	
Random Auto Restart Control	**0 ~ 62 sec.**	**0 ~ 6.2 sec.**	

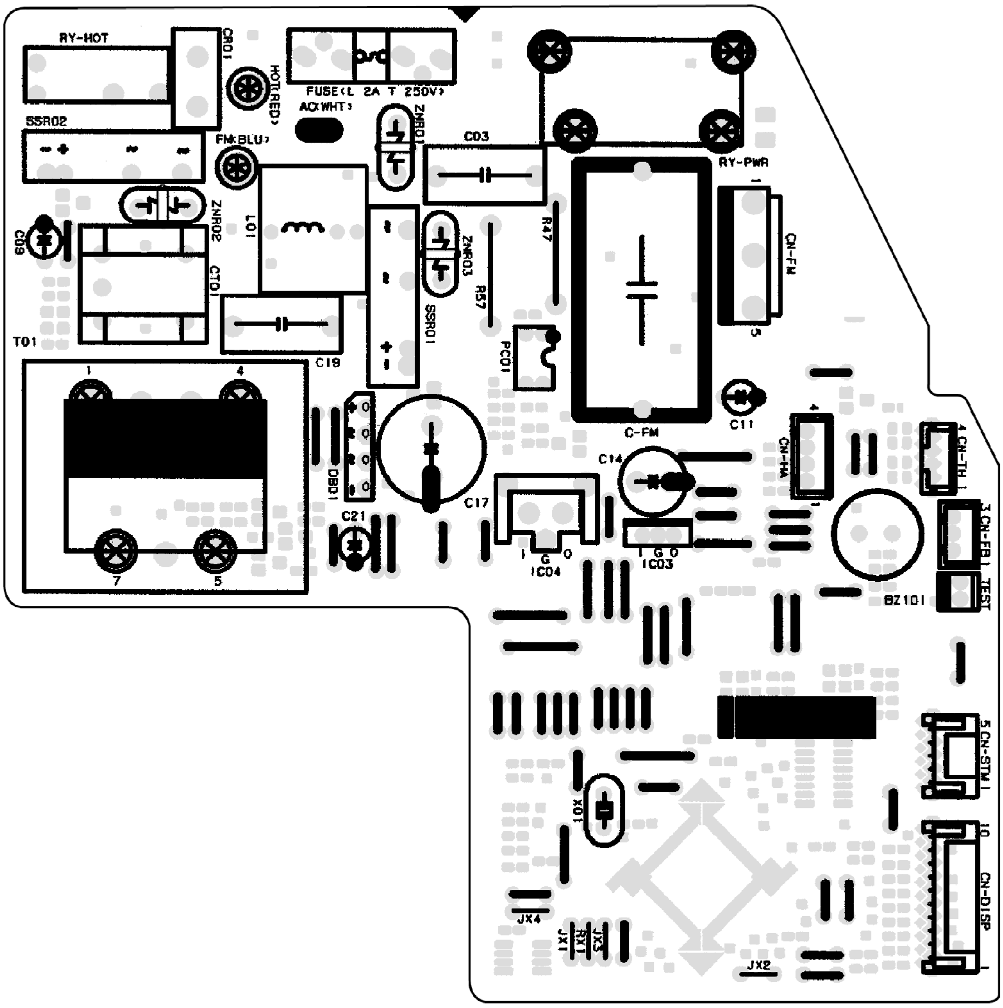
26.1. REMOTE CONTROL / /



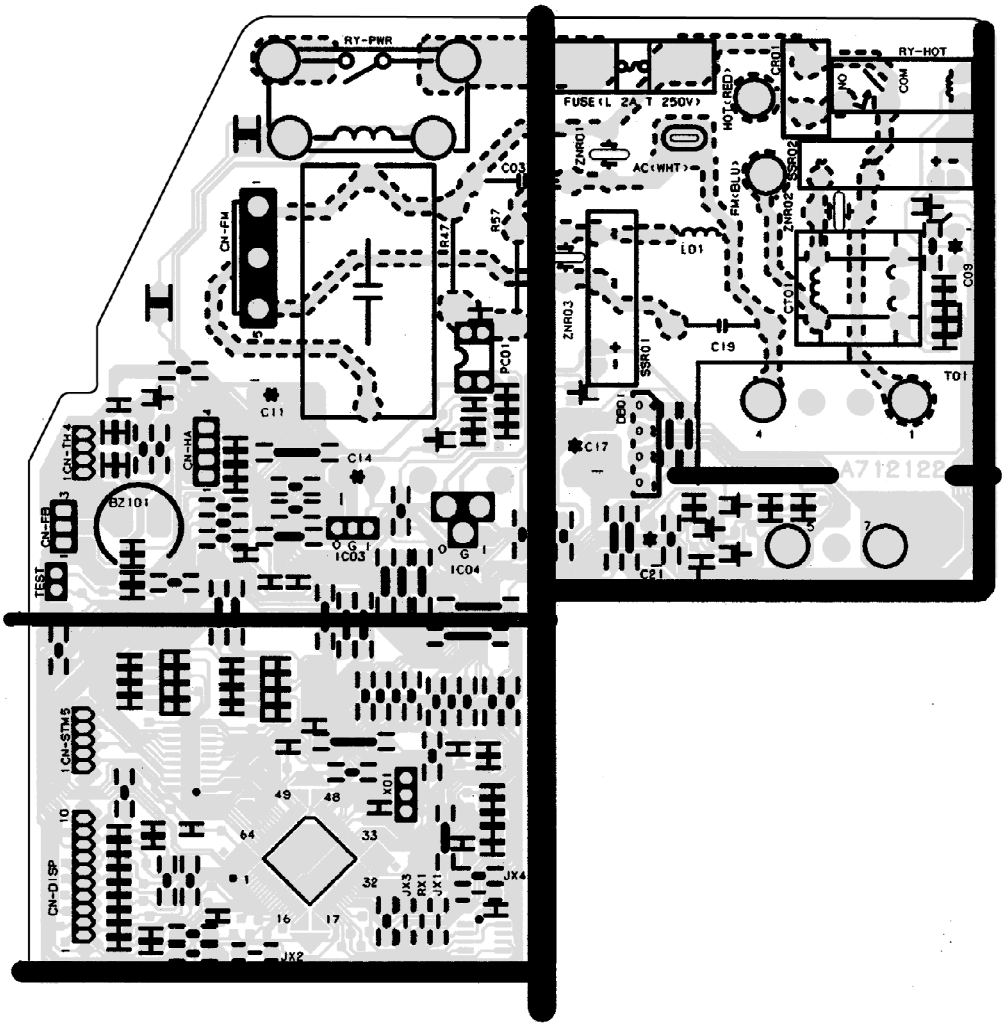
LIQUID CRYSTAL DISPLAY
WIRELESS REMOTE CONTROL
[ ] Unused Component
CN1
IC1
SBL3037M
SEG6
SEG5
SEG4
SEG3
SEG2
SEG1
COM3
COM2
COM1
COM0
VLCD3
VLCD2
VLCD1
VDD
OSC1
OSC2
SEG23
SEG24
SEG25/(P70)
SEG26/(P71)
SEG27/(P72)
SEG28/(P73)
SEG29/(P60)
SEG30/(P61)
SEG31/(P62)
SEG32/(P63)
RMO
P40
P23
P22
P21
P20
X0
X1
Vss
RESET
TP16
TP5
TP15
TP14
TP13
TP12
TP6
TP3
TP4
TP17
TP1
TP7
TP8
TP9
TP10
TP11
C6 10000p
C7 1000p
R6 220kΩ
R5 220kΩ
R4 220kΩ
R8 330kΩ
X1 3.52MHz
X2 32.768kHz
C4 12P
C5 10P
C2 47μ
R2 47Ω
D2 RB411D
R1 2.2Ω
D1 SID303
R3 1kΩ
Q1 D1320
R7 100kΩ
C1 47μ
C3 0.1μ
R03 x 2
RESET
J-A
J-B
SW1
TIMER CANCEL
SELF DIAGNOSIS
CLOCK
TIMER ON
TIMER ∧
TIMER SET
TIMER OFF
TIMER ∨
ECONOMY
SLEEP
AIR SWING AUTO
AIR SWING MANUAL
FAN SPEED
OFF / ON
TEMP ▲
TEMP ▼
POWERFUL
MODE

	J - A	J - B
0	SHORT	OPEN
1	OPEN	OPEN
2	SHORT	SHORT
3	OPEN	SHORT

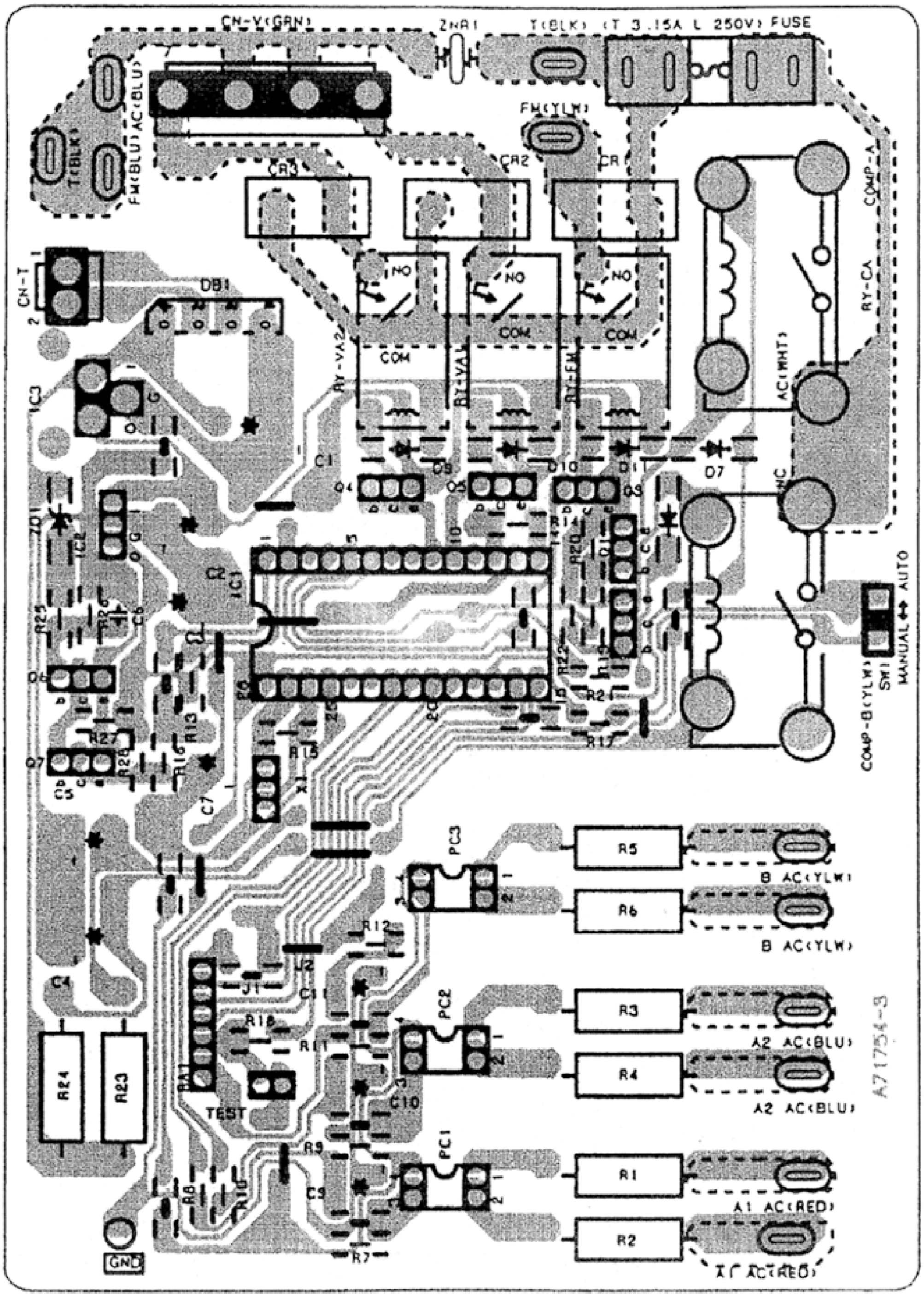
26.2. PRINT PATTERN / INDOOR UNIT PRINTED CIRCUIT BOARD / / / TOP VIEW


RY-HOT
CR01
HOT(RED)
FUSE(L 2A T 250V)
AC(WHT)
ZNR01
C03
SSR02
FM(BLU)
RY-PWR
ZNR02
L01
C09
CT01
ZNR03
R47
CN-FM
SSR01
R57
T01
C19
PC01
1
4
C-FM
C11
CN-HA
4 CN-TH
DB01
C14
C17
C21
I G O
IC04
I G O
IC03
3 CN-FB1
TEST
BZ101
7
5
5 CN-STM
X01
10 CN-DISP
JX4
JX1
RX1
JX3
JX2

26.3. PRINT PATTERN / INDOOR UNIT PRINTED CIRCUIT BOARD / / / BOTTOM VIEW

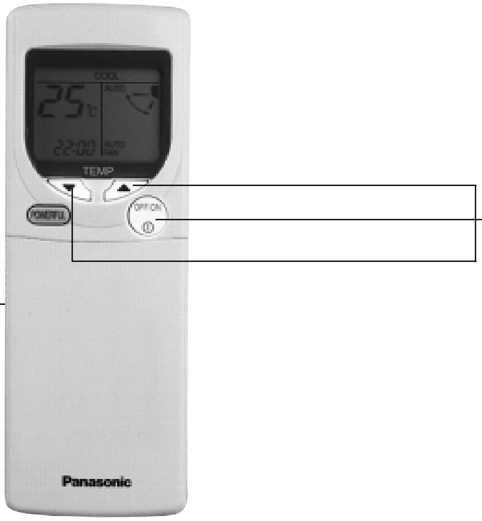

RY-PWR
FUSE (L 2A T 250V)
HOT (RED)
CR01
RY-HOT
NO
COM
ZNR01
AC (WHT)
SSR02
FM (BLU)
ZNR02
C03
R57
R47
CN-FM
1
5
LD1
C09
CT01
ZNR03
SSR01
C19
PC01
T01
C11
DB01
4
1
C17
A712122
CN-TH4
1
4
CN-HA
C14
BZ101
3
CN-FB
O G I
IC03
O G I
IC04
5
7
C21
TEST
CN-STM5
1
10
CN-DISP
1
49
48
X01
64
33
1
32
JX3
RX1
JX1
JX4
16
17
JX2

26.4. PRINT PATTERN / OUTDOOR UNIT PRINTED CIRCUIT BOARD / / CU-2V14BK / CU-3V20BK


CN-V(GRN)
ZNR1
T(BLK)
(T 3.15A L 250V) FUSE
FM(YLW)
T(BLK)
FM(BLU)
AC(BLU)
CR3
CR2
CR
COMP-A
RY-CA
NO
COM
RY-VA2
RY-VA1
RY-FM
CN-T
DB1
IC3
AC(WHT)
NC
C1
D9
D10
D11
D7
Q4
Q5
Q3
R14
Q1
Q2
ZD1
IC2
IC1
R20
R25
R26
C6
C2
C3
R21
R22
R19
R17
Q6
Q7
R27
R28
R13
R16
R15
C5
C7
X1
SW1
MANUAL
AUTO
COMP-B(YLW)
PC3
R5
R6
B AC(YLW)
R12
J2
J1
C11
PC2
R3
R4
A2 AC(BLU)
A71754-3
C4
R24
R23
R18
R11
RA1
TEST
C10
R9
PC1
R1
R2
A1 AC(RED)
R8
R10
C9
R7
GND

[MAICO] Printed in Malaysia /

Remote Control



Self illuminating button

OFF / ON ⏻

Operation OFF / ON

MODE

Operation Mode Selection

• AUTO	Automatic Operation Mode
• COOL	Cooling Operation Mode
• DRY	Soft Dry Operation Mode
• FAN	Air Circulation Mode

FAN SPEED

Indoor Fan Speed Selection

• FAN ■	Low Fan Speed
• FAN ■■■	Medium Fan Speed
• FAN ■■■■■	High Fan Speed
• AUTO FAN	Automatic Fan Speed

AIR SWING

Vertical Airflow Direction Control

• AUTO	Automatic Vertical Airflow Direction Control
• MANUAL	Vertical Airflow Direction Manual Control (5 stages of adjustment)

POWERFUL

Powerful Mode Operation OFF/ON

ECONOMY

Economy Mode Operation OFF/ON

TEMP.

Room Temperature Setting

Cooling, Soft Dry, Air Circulation Operation.

- Temperature Setting (16°C to 30°C)

Automatic Operation

• Hi	Operation with 2°C higher than standard temperature.
•	Operation with standard temperature.
• Lo	Operation with 2°C lower than standard temperature.

ON-TIMER
OFF-TIMER

Timer Operation Selection

- 24-hour, OFF / ON Real Timer Setting.

TIME

Time / Timer Setting

- Hours and minutes setting.

SET
CANCEL

Timer Operation Set / Cancel

- ON Timer and OFF Timer setting and cancellation.

CLOCK

Clock Setting

- Current time setting.

SLEEP

Sleep Mode Operation OFF / ON

Indoor Unit

AUTO
OFF / ON

Automatic Operation Button

- Press for < 5s to operate Automatic operation mode.
  (Used when the remote control cannot be used.)
- Press continuously for 5s or < 10s to operate Test Run/Pump down. “Beep” sound will be heard at the 5th second. (Used when test running or servicing.)
- Press continuously for 10s and above to omit or resume the remote control signal receiving sound. “Beep, beep” sound will be heard at the 10th second.

Operation Indication Lamps (LED)

POWER (Green)	Lights up in operation, blinks in Automatic Operation Mode judging.
SLEEP (Orange)	Lights up in Sleep Mode Operation.
TIMER (Orange)	Lights up in Timer Setting.
POWERFUL (Orange) ..	Lights up in Powerful Mode Operation.
ECONOMY (Green)	Lights up in Economy Mode Operation.

Operation Mode

- Cooling, Soft Dry, Air Circulation and Automatic Mode.

Powerful Operation

- Reaches the desired room temperature quickly.

Economy Operation

- To reduce electrical power consumption.

Random Auto Restart Control

- Operation is restarted randomly after power failure at previous setting mode.

Anti-Freezing Control

- Anti-Freezing control for indoor heat exchanger. (Cooling and Soft Dry)

Sleep Mode Auto Control

- Indoor Fan operates at Low speed.
- Operation stops after 8 hours.

Indoor Fan Speed Control

- High, Medium and Low.
- Automatic Fan Speed Mode
  - Cooling : Fan rotates at Hi, Me and SLo speed. Deodorizing control is available.
  - Soft Dry: Fan rotates at SLo speed. Deodorizing control is available.

Airflow Direction Control

- Automatic air swing and manual adjusted by remote control for vertical airflow.
- Manually adjusted by hand for horizontal airflow.

Starting Current Control

- Fan motor is delayed for 1.6 seconds when compressor starts simultaneously.

Time Delay Safety Control

- Restarting is inhibited for appro. 3 minutes.

7 Minutes Time Save Control

- Cooling Operation only.

Anti-Dew Formation Control

- Anti-Dew Formation Control for indoor unit discharge area.

Outdoor Unit

CU-2V14BK, CU-2V18BK, CU-2V19BK & CU-3V20BK

Compressor Reverse Rotation Protection Control

- To protect compressor from reverse rotation when there is a instantaneous power failure.

Overload Protector

- 2-Stage OLP to protect the compressor. Overload Protector will trip when
  - Temperature of compressor increases to 120°C.
  - High temperature or high current flows to compressor. (Refer circuit diagram for OLP characteristic)

60 Secs. Forced Operation Control

- Once the compressor is activated, it does not stop within the first 60 secs. However, it stops immediately with remote control stop signal.

Outdoor Fan Operation Control

- Temperature Fuse.

SAFETY PRECAUTIONS

Before operating, please read the following “Safety Precautions” carefully.

- To prevent personal injury, injury to others and property damage, the following instructions must be followed.
- Incorrect operation due to failure to follow instructions will cause harm or damage, the seriousness of which is classified as follow:

⚠ Warning

This sign warns of death or serious injury.

⚠ Caution

This sign warns of damage to property.

- The instructions to be followed are classified by the following symbols:

🚫

This symbol (with a white background) denotes an action that is PROHIBITED.

❗

These symbols (with a black background) denote actions that are COMPULSORY.

Installation Precautions

⚠ Warning

- **Do not install, remove and reinstall the unit by yourself.** Improper installation will cause leakage, electric shock or fire. Please engage an authorized dealer or specialist for the installation work.

⚠ Caution

- **This room air conditioner must be earthed.** Improper grounding could cause electric shock.
- **Ensure that the drainage piping is connected properly.** Otherwise, water will leak out.
- **Do not install the unit in a potentially explosive atmosphere.** Gas leak near the unit could cause fire.

Operation Precautions

⚠ Warning

This sign warns of death or serious injury.

- Do not share outlet.
- Do not operate with wet hands.
- Do not damage or modify the power cord.
- Do not insert finger or other objects into the indoor or outdoor units.
- Do not expose directly to cold air for a long period.

- Use specified power cord.

- If abnormal condition (burnt smell, etc.) occurs, switch off the power supply.

⚠ Caution

This sign warns of injury.

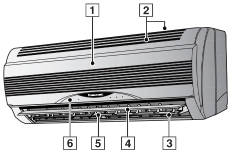
- Do not wash the unit with water.
- Do not use for other purposes such as preservation.
- Do not use any combustible equipment at airflow direction.
- Do not sit or place anything on the outdoor unit.

- Switch off the power supply before cleaning.
- Ventilate the room regularly.
- Pay attention as to whether the installation rack is damaged after long period of usage.

- Switch off the power supply if the unit is not used for a long period.

NAME OF EACH PART

Indoor Unit



1 Front Panel

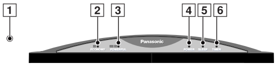
2 Air Intake Vent

3 Air Outlet Vent

4 Vertical Airflow Direction Louver

5 Horizontal Airflow Direction Louver (manually adjusted)

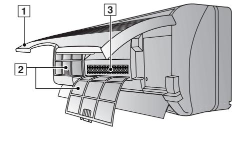
6 Indicator Panel



1 Auto Operation Button (when the front panel is opened)

2 Economy Mode Indicator	–	GREEN
3 Powerful Mode Indicator	–	ORANGE
4 Power Indicator	–	GREEN
5 Sleep Mode Indicator	–	ORANGE
6 Timer Mode Indicator	–	ORANGE

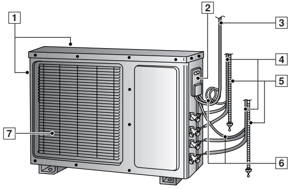
- **Indoor Unit** (when the front panel is opened)



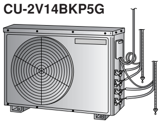
1 Front Panel   2 Air Filters   3 Air Purifying Filter

Outdoor Unit

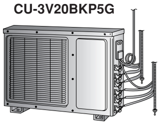
CU-2V18BKP5G
CU-2V19BKP5G



CU-2V14BKP5G



CU-3V20BKP5G



1 Air Intake Vents

2 Ground Terminal (Inside cover)

3 Power Supply Cord

4 Piping

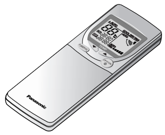
5 Drain Hose

6 Connecting Cable

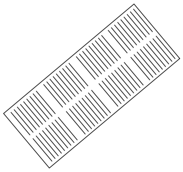
7 Air Outlet Vents

Accessories

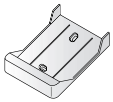
- **Remote Control**



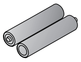
- **Remote Control Indication Sticker**



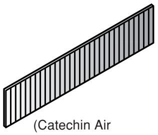
- **Remote Control Holder**



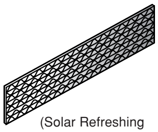
- **Two RO3 (AAA) dry-cell batteries or equivalent**



- **Air Purifying Filter**



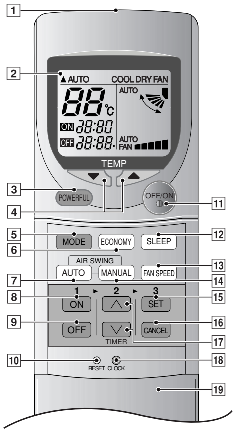
(Catechin Air Purifying Filter)



(Solar Refreshing Deodorizing Filter)

NAME OF EACH PART

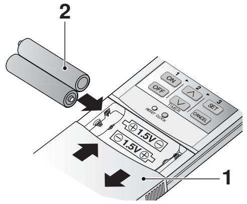
■ Remote Control


1
2
AUTO
COOL DRY FAN
AUTO
88°C
ON 88:88
OFF 88:88
AUTO FAN
TEMP
3
4
POWERFUL
OFF/ON
11
5
6
MODE
ECONOMY
SLEEP
12
AIR SWING
AUTO
MANUAL
FAN SPEED
13
14
7
8
1 ▸ 2 ▸ 3
ON
SET
15
9
OFF
CANCEL
16
TIMER
17
10
RESET CLOCK
18
19

- **Remote Control Signal.**
  - Make sure it is not obstructed.
  - Maximum distance : 10 m.
  - Signal received sound.
    One short beep or one long beep.
- **Notes for Remote Control.**
  - Do not throw or drop.
  - Do not get it wet.
  - Certain type of fluorescent lamps may affect signal reception. Consult your dealer.

1	Signal Transmitter
2	Operation Display
3	Powerful Mode Operation Button
4	Room Temperature Setting Button (self-illuminating button)
5	Operation Mode Selection Button
6	Economy Mode Operation Button
7	Auto Airflow Direction Button
8	ON-Timer Button
9	OFF-Timer Button
10	Reset Point (Press with fine-tipped object to clear the memory)
11	OFF/ON Button (self-illuminating button)
12	Sleep Mode Operation Button
13	Fan Speed Selection Button
14	Manual Airflow Direction Selection Button
15	Timer Set Button
16	Timer Cancellation Button
17	Time-Setting Button
18	Clock Button
19	Remote Control Cover

- **How to Insert the Batteries**


2
1
1.5V
1.5V
ON
OFF
SET
CANCEL

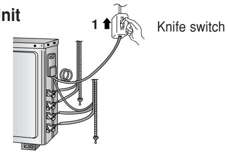
1 **Slide down the remote control cover completely**

2 **Insert the batteries**
- Be sure the direction is correct
- 12.00 at display - flashing
- Set the current time (CLOCK) immediately to prevent battery exhaustion.

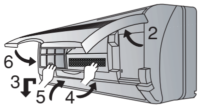
- **About the batteries**
  - Can be used for approximately one year.
- **Observe the following when replacing the batteries**
  - Replace with new batteries of the same type.
  - Do not use rechargeable batteries (Ni-Cd).
  - Remove the batteries if the unit is not going to be used for a long period.

PREPARATION BEFORE OPERATION

■ Indoor Unit


1
Knife switch

1 Set the knife switch to "ON"



2 Open the front panel

3 Remove the air filters

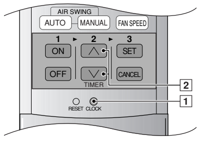
4 Fit the air purifying filters in place

5 Insert the air filters

6 Close the front panel

■ Remote Control

– To set the current time

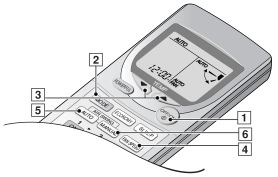

AIR SWING
AUTO
MANUAL
FAN SPEED
1 ▸ 2 ▸ 3
ON
SET
OFF
CANCEL
TIMER
RESET CLOCK
2
1

1 **Press 1.**

2 **Then press 2 to increase or decrease the time.**

3 **Press 1 again.**
Set time at display will light up.

HOW TO OPERATE


2
3
5
1
6
4
AUTO
12:00
TEMP
POWERFUL
MODE
ECONOMY
SLEEP
AUTO
MANUAL
FAN SPEED

■ To start the operation

- Press 1.
- POWER indicator (green) on the indoor unit will light up.
- To stop, press once more.

■ Setting Mode

- Press 2 to select:-

AUTO – Automatic Operation
COOL – Cooling Operation
DRY – Soft Dry Operation
FAN – Air Circulation Operation

■ Setting Temperature

- Press 3 to increase or decrease the temperature.
- The temperature can be set between 16°C ~ 30°C.
- Recommended temperature:

COOL	26°C ~ 28°C
DRY	1°C ~ 2°C lower than the room temperature

- During **AUTO** Operation, press 3 to select:-

AUTO Hi
- Operation with 2°C higher than the standard temperature.

AUTO
- Operation with the standard temperature.

AUTO Lo
- Operation with 2°C lower than the standard temperature.

- **Standard Temperature**

Indoor temperature	Operation	Standard temperature
23°C	Cooling	25°C
	Soft Dry	22°C

- Once the Automatic Operation is selected, the indoor temperature sensor operates automatically to select the desired operation mode with Cooling or Soft Dry.
- After the operation mode has been selected, the mode does not change.

■ Setting the Fan Speed

- Press 4 to select:-

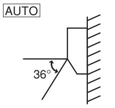
FAN ■ – Low Fan Speed
FAN ■■■ – Medium Fan Speed
FAN ■■■■■ – High Fan Speed
AUTO
FAN – Automatic Fan Speed
The speed of the indoor fan is adjusted automatically according to the operation. The indoor fan stops occasionally during cooling operation.

■ Setting the Vertical Airflow Direction

- Press 5 or 6 to select:-

COOL / DRY Operation

AUTO

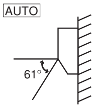


Swing up/down
Automatically

MANUAL
Five stages of adjustment can be made between 14° ~ 36°.

FAN Operation

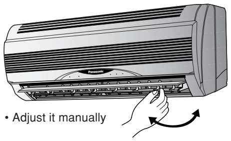
AUTO



Move up or down
Automatically

MANUAL
Five stages of adjustment can be made between 0° ~ 61°.

■ Setting the Horizontal Airflow Direction



- Adjust it manually

● Use this air conditioner under the following conditions:

Unit in °C

DBT: Dry Bulb Temp WBT: Wet Bulb Temp	Indoor		Outdoor	
	DBT	WBT	DBT	WBT
Maximum Temperature	32	23	43	26
Minimum Temperature	16	11	16	11

● Notes

- If the unit is not going to be used for an extended period of time, turn off the main power supply. If it is left at the ON position, approximately 2.5 W of electricity will be used even if the indoor unit has been turned off with the remote control.
- If operation is stopped, then restart immediately, the unit will resume operation only after 3 minutes.

● Operation Details

COOL – Cooling Operation

- To set the room temperature at your preference cooling comfort.

AUTO – Automatic Operation

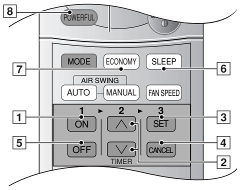
- Sense indoor temperature to select the optimum mode.
- Temperature is not displayed on the remote control during AUTO operation.

DRY – Soft Dry Operation

- A very gentle Cooling Operation, prior to dehumidification. It does not lower the room temperature.
- During Soft Dry operation, the indoor fan operates at Low fan speed.

FAN – Air Circulation Operation

- When the room temperature reaches the set temperature, operation commences at Low airflow volume. It stops when the room temperature drops to 2°C below the set temperature.
(It is useful when using a heater).



SETTING THE TIMER

Ensure that the current time is correct before setting the timer. The timer cannot be set if the time display is flashing.

■ ON-TIMER Operation

To start the air conditioner operation automatically.

- Press 1 to set the operation.
- Press 2 to increase or decrease the time.
- Then press 3.
- To cancel this operation, press 4.

■ OFF-TIMER Operation

To stop the air conditioner operation automatically.

- Press 5 to set the operation.
- Press 2 to increase or decrease the time.
- Then press 3.
- To cancel this operation, press 4.

● Timer Mode Operation Details

- When the ON-Timer is set, operation will start before the actual set time. This is to enable the room temperature reaches the set temperature at the set time.

COOL,DRY, AUTO	15 minutes in advance

- Once the ON-Timer is set, operation will start at the set time everyday.
- The current time is not displayed when the timers are set.
- When both timers are used together, the TIMER mode indicator on the indoor unit remains lit even when the operation is stopped by the OFF-TIMER.

CONVENIENCE OPERATION

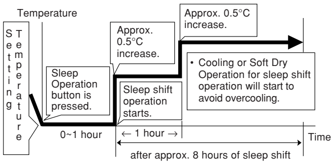
■ Sleep Mode Operation

To obtain a comfortable room temperature while sleeping:-

- Press 6.
- Sleep mode indicator on the indoor unit will light up.
- To cancel this operation, press once more.

● Sleep Mode Operation Details

- When the room temperature reaches the set temperature, the airflow volume will change to low automatically.
- Sleep Mode Operation time is 8 hours.
- When used together with the timer, the timer has a priority.



■ Economy Mode Operation

To save electrical power consumption.
Please use this mode when the room has reached your desired temperature.

- Press 7.
- ※ Economy mode indicator (green) on the indoor unit will light up.
- Press once more to cancel this operation.

■ Powerful Mode Operation

To obtain the set temperature quickly.

- Press 8.
- ※ Powerful mode indicator (orange) on the indoor unit will light up.
- ※ Powerful mode will operate for 15 minutes only.
- To cancel this operation, press once more.

● Economy / Powerful Mode Operation Details

- Economy and Powerful operation cannot be selected simultaneously.
- The changes of the temperature and airflow volume are automatic.
- The remote control display remains unchanged.
- If sleep button or operation mode button is pressed, economy or powerful operation will be cancelled.
- During **FAN** – Air circulation operation, the powerful and economy operation are not available.

Economy Mode Operation	Temperature	Airflow volume
COOL / DRY	0.5°C higher than set temp.	Super Low

Powerful Mode Operation	Temperature	Airflow volume
COOL / DRY	3°C lower than set temp.	Super High

CARE AND MAINTENANCE

Cleaning the Indoor Unit and Remote Control

- Wipe gently with a soft, dry cloth.
- Do not use water hotter than 40˚C or polishing fluid to clean the unit.

Cleaning the Air Filter

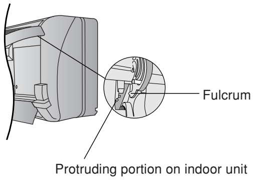
(Recommendation:- If the unit is operated in a dusty environment, clean the filters every two weeks, continuous use of this dirty filters will reduce cooling efficiency)

1. Remove dirt using a vacuum cleaner.
2. Wash back of the air filter with water.
3. If badly soiled, wash it with soap or a mild household detergent.
4. Let it dry and reinstall it.
   Be sure the "FRONT" mark is facing you.
   ※ Damaged air filter.
   Consult the nearest authorized dealer.
   Part No.: CWD001047.
   - Do not use benzene, thinner, scouring powder or clothes soaked in caustic chemical to clean the unit.

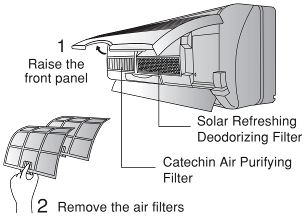
Cleaning the Front Panel

(Must be removed before washing)

1. Raise the front panel higher than the horizontal and pull to remove it.
2. Gently wash with water and a sponge.
   - Do not press the front panel too hard when washing.
   - When use kitchen cleaning fluid (neutral detergent), rinse throughly.
   - Do not dry the front panel under direct sunlight.
3. To fix the front panel, raise the front panel horizontally, match the protruding portion on the indoor unit to the fulcrum and push into place.



Air Purifying Filters


1
Raise the front panel
Solar Refreshing Deodorizing Filter
Catechin Air Purifying Filter
2 Remove the air filters

- **Solar Refreshing Deodorizing Filter**
  - Used to remove unpleasant odour and deodorize the air in the room.
  - Reusable.
  - Vacuum, place under direct sunlight for 6 hours and fit it back in place.
    (Recommended: every 6 months)
- **Catechin Air Purifying Filter**
  - The filter is coated with catechin to prevent growth of bacteria and viruses.
  - Reusable.
  - Vacuum and fit it back in place
    (Recommended: every 6 months)

- Recommended to change these filters every 3 years.
  Do not reuse damaged filters.
  Consult the nearest authorized dealer to purchase a new filter.
  Catechin Air Purifying Filter No.: CZ-SF70P
  Solar Refreshing Deodorizing Filter No.: CZ-SFD70P

- If you operate the air conditioner with dirty filters:-
  – Air is not purified
  – Cooling capacity decreases
  – Foul odour is emitted

Pre-season Inspection

- **Is the discharged air cold?**
  Operation is normal if 15 minutes after the start of operation, the difference between the air intake and outlet vents temperature is:-

  COOL – 8°C or above

- **Are the air intake or outlet vents of the indoor or outdoor units obstructed?**
- **Are the remote control batteries weak?**
  If the remote control display appears weak, replace the batteries.

When the Air Conditioner is Not Used for an Extended Period of Time

1. To dry the internal parts of the indoor unit, operate the unit for 2 - 3 hours using:-

   FAN operation

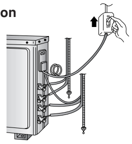
2. Stop the operation by remote control and switch off the knife switch.
   Note: If the unit is not switched off by the remote control, it will start operating when the knife switch is switched to ON (because the unit is equipped with Auto Restart Control).
3. Remove the remote control batteries.

Recommended Inspection

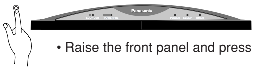
- After used over several seasons, the unit will become dirty and thus decreases the unit's performance. Depending on the operation conditions, a dirty unit may produce odour and dust may pollute dehumidification system. Therefore, a seasonal inspection is recommended in addition to regular cleaning. (Consult an authorized dealer).

HELPFUL INFORMATION

Auto Operation Button



- Confirm the knife switch at "ON"



- Raise the front panel and press

- **Automatic Operation**
  - If the remote control fails to function or has been misplaced, press the Auto Operation button to start the Automatic operation.
  - The Automatic operation will be activated immediately once the Auto operation button is pressed. However, temperature cannot be adjusted in this operation.
  - The power indicator on the indoor unit will blink until the operation mode is selected automatically.
  - To cancel this operation, press once more.
- **Remote Control Signal Receiving Sound**
  - To switch off the beep (Signal Receiving Sound), press the Auto Operation button for 10 seconds continuously or longer.
    "Beep", "beep" sound will be heard at the tenth seconds.
    Note: "Beep" sound will be heard at the fifth seconds;
    However please press continuously until you heard "beep", "beep" sound.
  - Repeat the above steps if you want to switch on the Signal Receiving Sound.
- **(This is for Servicing purposes only)**
  Note: If you press this button continuously for 5 to 10 seconds, Test Run operation will be performed.
  A "beep" sound will be heard at the fifth seconds indicating the Test Run starts to operate.

Auto Restart Control

- If power is resumed after a power failure, the operation will restart automatically after 3 - 5 1/2 minutes.
- Operation will be restarted automatically under the previous operation mode and airflow direction when power is resumed as the operation is not stopped by the remote control.

Timer Setting

- When power failure occurs, the timer setting will be cancelled. Once power is resumed, reset the timer.

Thunder and Lightning

- This air conditioner is equipped with a built-in surge protective device. However, in order to further protect your air conditioner from being damaged by abnormally strong lightning activity, you may switch off the knife switch.

ENERGY SAVING AND OPERATION HINTS

Setting the Temperature

- Approximately 10% of electricity can be saved.
- Set the temperature 1°C higher than the desired temperature.

Air Filters and Air Purifying Filters

- Clean the air filters every 2 weeks and the Air Purifying Filters every 6 months.
- Dirty filters may reduces cooling efficiency.

Keep All Doors and Windows Closed

- Otherwise, cooling performance will be reduced and electricity cost is wasted.

Outdoor Unit

- Do not block the air outlet vents. Otherwise, it will lower the cooling performance.

Timer and Sleep Mode

- To prevent wastage of electricity, use sleep mode when sleeping or Timer when going out.

Avoid Direct Sunlight

- Keep curtains or drapes closed to avoid direct sunlight during cooling operation.

TROUBLESHOOTING

■ Normal Operation

Is it okay?	This is the answer
Air conditioner has been restarted, but does not operate for 3 minutes.	This is to protect the air conditioner. Wait until the air conditioner begins to operate.
A sound like water flowing can be heard.	This is the sound of refrigerant flowing inside the air conditioner.
It seems that fog is coming out from the air conditioner.	Condensation occurs when the airflow from the air conditioner cools the room.
The room has a peculiar odour.	This may be a damp smell emitted by the wall, carpet, furniture or clothing in the room.
During Automatic Airflow setting, indoor fan stops occasionally.	This is to remove smell emitted by the surroundings.
The outdoor unit emits water or steam.	In COOL/DRY operation, moisture in the air condenses into water on the cool surface of outdoor unit piping that causes dripping.

■ Abnormal Operation

Is it okay?	Please check
The air conditioner does not operate.	Has the circuit breaker been tripped? Is the timer being used correctly?
Air conditioner produces loud noise during operation.	Is the installation work slanted? Is the front grille closed properly?
The air conditioner does not cool effectively.	Has the temperature been set incorrectly? Are the filters dirty? Are the intake or outlet vents of the outdoor unit obstructed? Are all windows and doors closed?

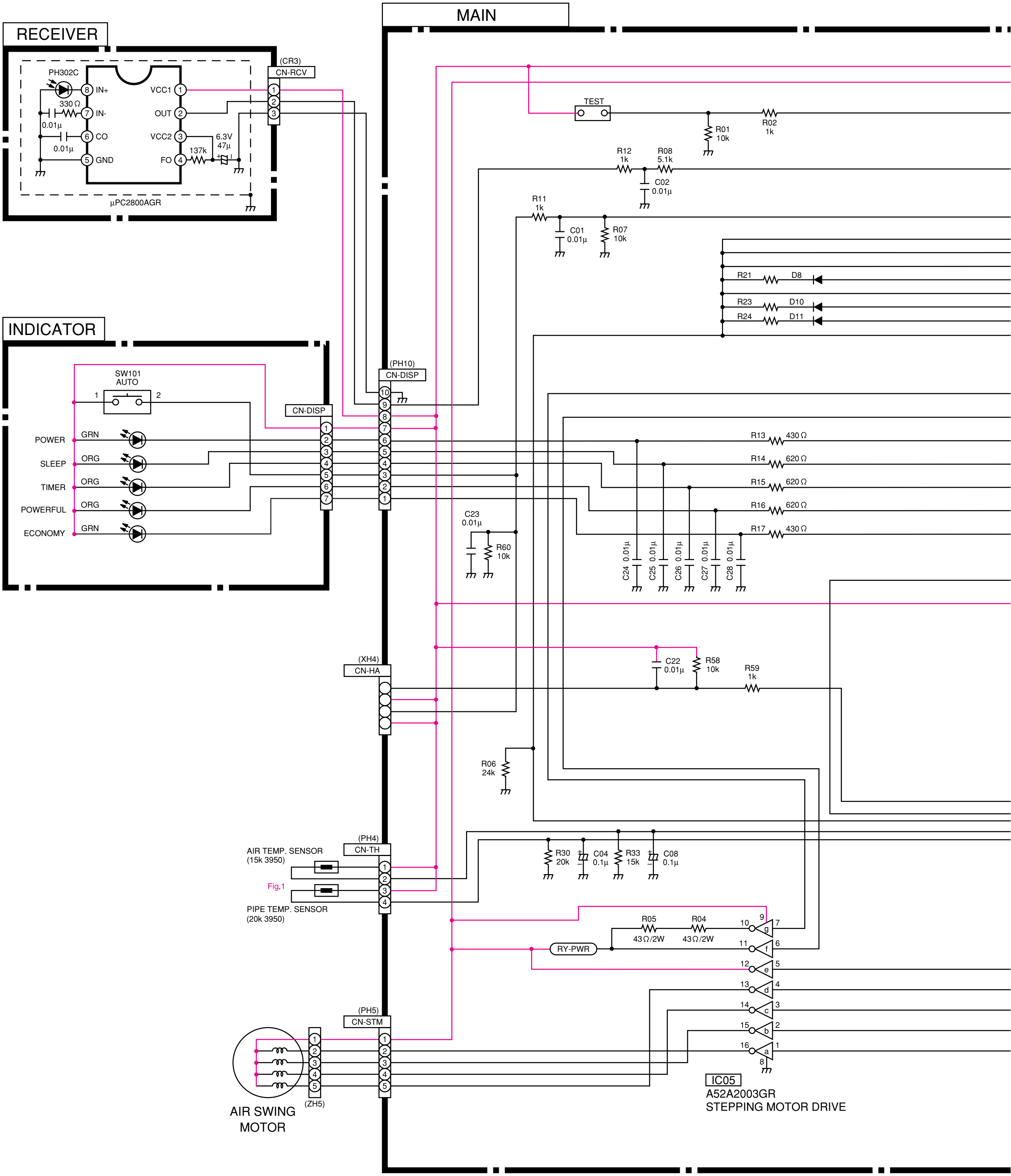
■ Call the Dealer Immediately

If the following conditions occur, turn off the main power supply, and then call the dealer immediately.

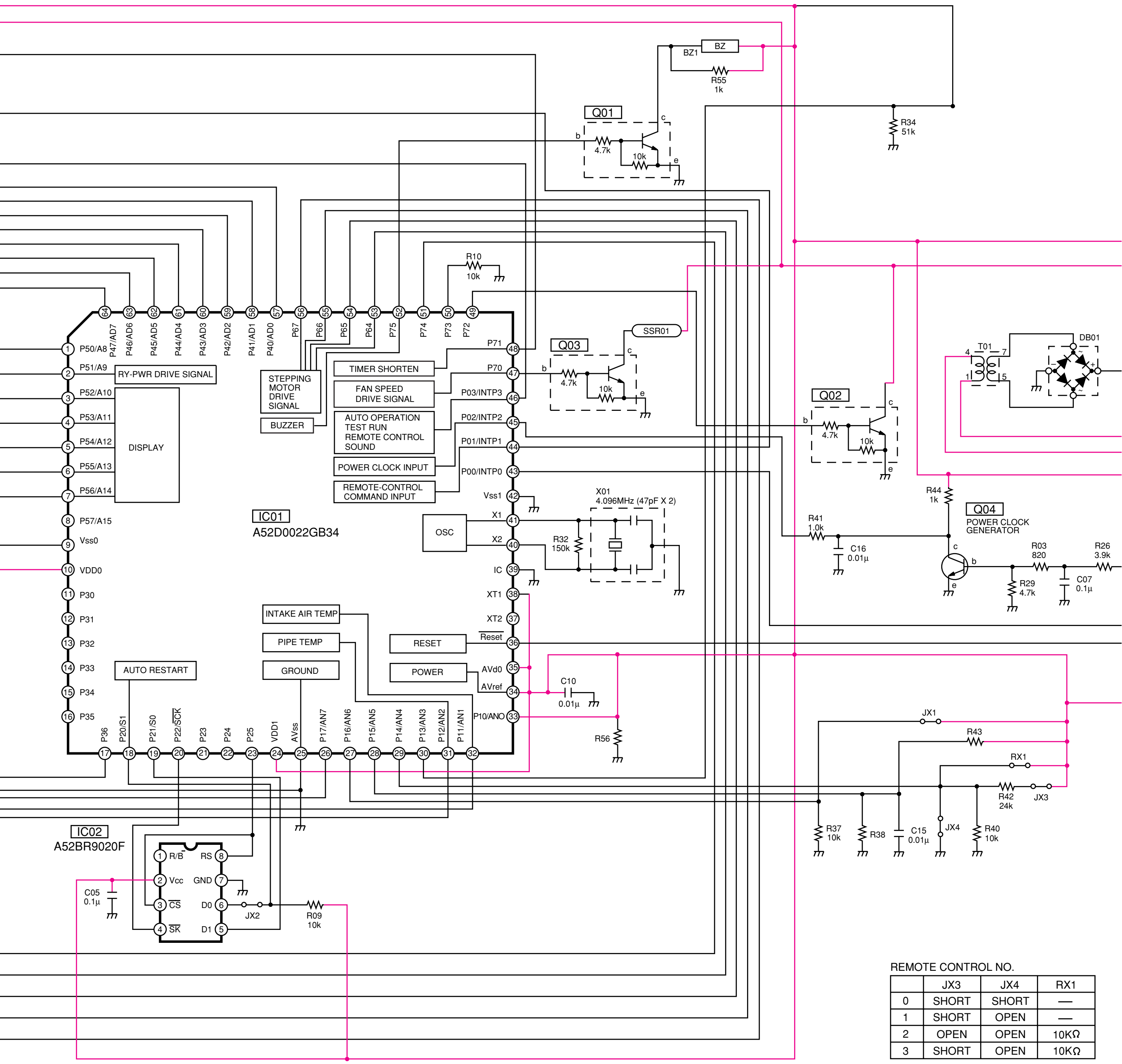
- **Abnormal noise is heard during operation.**
- **Water or foreign material gets into the remote control by mistake.**
- **Water leak from the indoor unit.**
- **Switches or buttons do not operate properly.**
- **The circuit breaker switches off frequently.**
- **Power supply cord become unusually warm.**

- **CS-V9BKPG / CU-2V14BKP5G**
- **CS-V9BKPG / CU-2V18BKP5G**
- **CS-V9BKPG / CU-3V20BKP5G**
- **CS-V7BKPG / CU-2V19BKP5G**
  CS-V12BKPG

SCHEMATIC DIAGRAM 1/7


RECEIVER
PH302C
8 IN+
330 Ω
7 IN-
0.01µ
6 CO
0.01µ
5 GND
VCC1 1
OUT 2
VCC2 3
FO 4
137k
6.3V
47µ
µPC2800AGR
(CR3)
CN-RCV
1
2
3
MAIN
TEST
R01
10k
R02
1k
R12
1k
R08
5.1k
C02
0.01µ
R11
1k
C01
0.01µ
R07
10k
R21
D8
R23
D10
R24
D11
INDICATOR
SW101
AUTO
1
2
POWER
GRN
SLEEP
ORG
TIMER
ORG
POWERFUL
ORG
ECONOMY
GRN
CN-DISP
(PH10)
CN-DISP
R13 430 Ω
R14 620 Ω
R15 620 Ω
R16 620 Ω
R17 430 Ω
C23
0.01µ
R60
10k
C24 0.01µ
C25 0.01µ
C26 0.01µ
C27 0.01µ
C28 0.01µ
(XH4)
CN-HA
C22
0.01µ
R58
10k
R59
1k
R06
24k
(PH4)
CN-TH
AIR TEMP. SENSOR
(15k 3950)
Fig.1
PIPE TEMP. SENSOR
(20k 3950)
R30
20k
C04
0.1µ
R33
15k
C08
0.1µ
R05
43 Ω /2W
R04
43 Ω /2W
RY-PWR
(PH5)
CN-STM
(ZH5)
AIR SWING
MOTOR
IC05
A52A2003GR
STEPPING MOTOR DRIVE

SCHEMATIC DIAGRAM 2/7

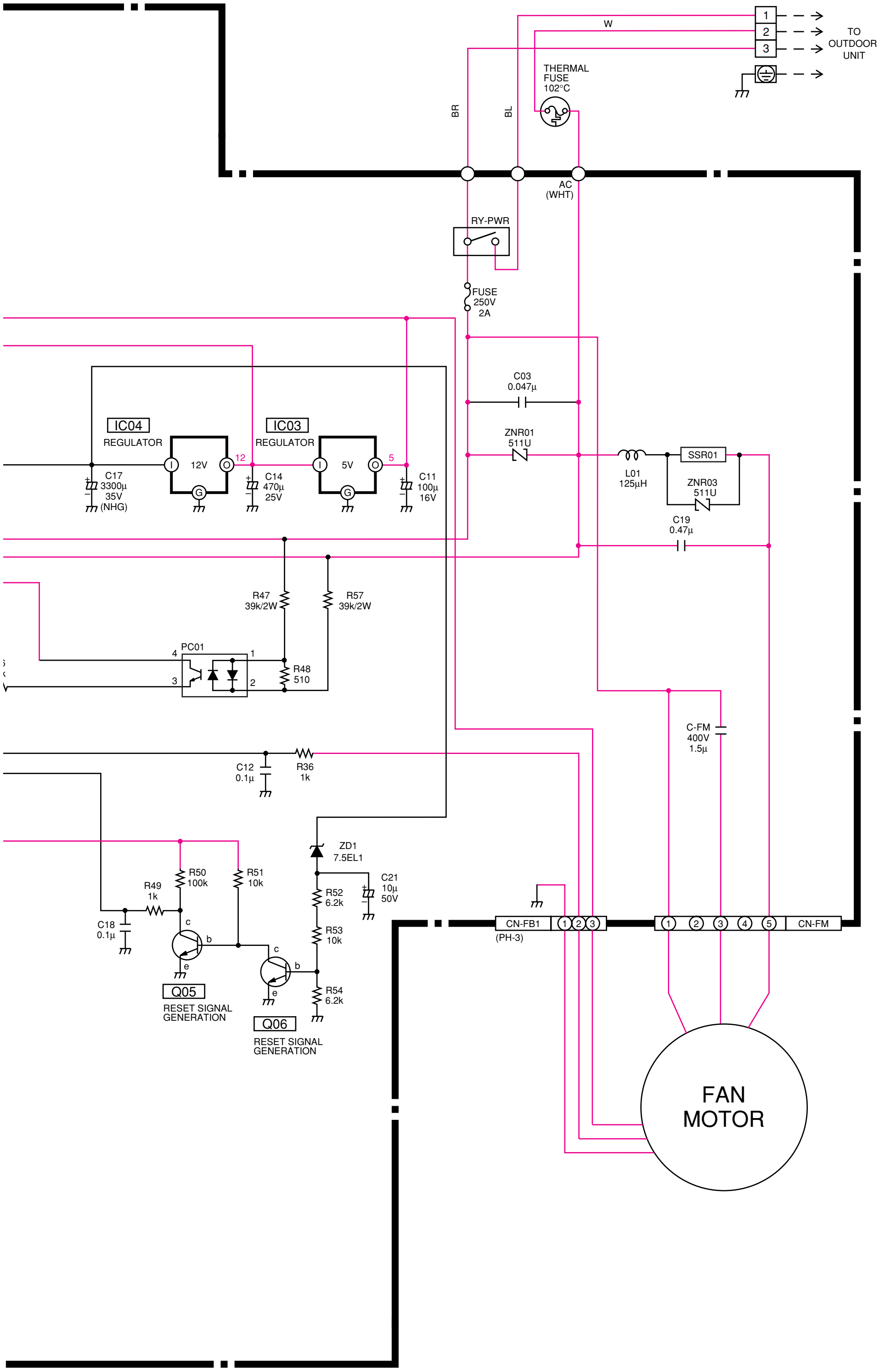


IC01
A52D0022GB34
P50/A8
P51/A9
P52/A10
P53/A11
P54/A12
P55/A13
P56/A14
P57/A15
Vss0
VDD0
P30
P31
P32
P33
P34
P35
P47/AD7
P46/AD6
P45/AD5
P44/AD4
P43/AD3
P42/AD2
P41/AD1
P40/AD0
P67
P66
P65
P64
P75
P74
P73
P72
P71
P70
P03/INTP3
P02/INTP2
P01/INTP1
P00/INTP0
Vss1
X1
X2
IC
XT1
XT2
Reset
AVd0
AVref
P10/ANO
P36
P20/S1
P21/S0
P22/SCK
P23
P24
P25
VDD1
AVss
P17/AN7
P16/AN6
P15/AN5
P14/AN4
P13/AN3
P12/AN2
P11/AN1
RY-PWR DRIVE SIGNAL
DISPLAY
STEPPING MOTOR DRIVE SIGNAL
BUZZER
TIMER SHORTEN
FAN SPEED DRIVE SIGNAL
AUTO OPERATION TEST RUN REMOTE CONTROL SOUND
POWER CLOCK INPUT
REMOTE-CONTROL COMMAND INPUT
OSC
AUTO RESTART
INTAKE AIR TEMP
PIPE TEMP
GROUND
RESET
POWER
BZ1
BZ
R55 1k
Q01
4.7k
10k
R34 51k
R10 10k
Q03
SSR01
Q02
T01
DB01
X01 4.096MHz (47pF X 2)
R32 150k
R44 1k
Q04 POWER CLOCK GENERATOR
R41 1.0k
C16 0.01μ
R03 820
R26 3.9k
R29 4.7k
C07 0.1μ
C10 0.01μ
R56
JX1
R43
RX1
R42 24k
JX3
JX4
R37 10k
R38
C15 0.01μ
R40 10k
IC02
A52BR9020F
R/B
RS
Vcc
GND
CS
D0
SK
D1
C05 0.1μ
JX2
R09 10k

REMOTE CONTROL NO.

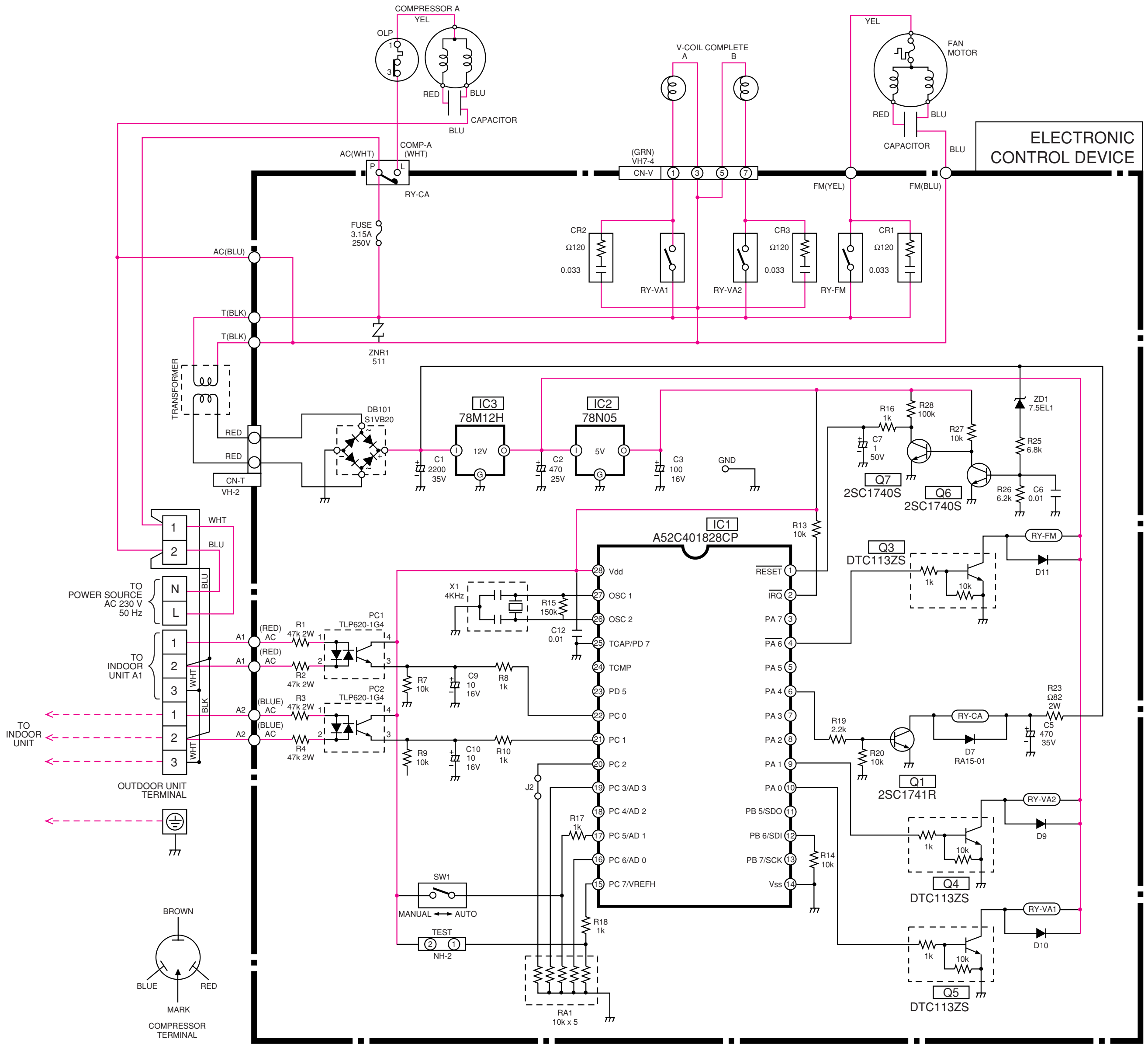
	JX3	JX4	RX1
0	SHORT	SHORT	—
1	SHORT	OPEN	—
2	OPEN	OPEN	10KΩ
3	SHORT	OPEN	10KΩ

SCHEMATIC DIAGRAM 3/7


1
2
3
TO
OUTDOOR
UNIT
W
THERMAL
FUSE
102°C
BR
BL
AC
(WHT)
RY-PWR
FUSE
250V
2A
C03
0.047µ
ZNR01
511U
L01
125µH
SSR01
ZNR03
511U
C19
0.47µ
IC04
REGULATOR
12V
12
IC03
REGULATOR
5V
5
C17
3300µ
35V
(NHG)
C14
470µ
25V
C11
100µ
16V
R47
39k/2W
R57
39k/2W
PC01
4
1
3
2
R48
510
C-FM
400V
1.5µ
C12
0.1µ
R36
1k
ZD1
7.5EL1
C21
10µ
50V
R50
100k
R51
10k
R49
1k
R52
6.2k
R53
10k
R54
6.2k
C18
0.1µ
c
b
e
Q05
RESET SIGNAL
GENERATION
Q06
RESET SIGNAL
GENERATION
CN-FB1
(PH-3)
1
2
3
CN-FM
1
2
3
4
5
FAN
MOTOR

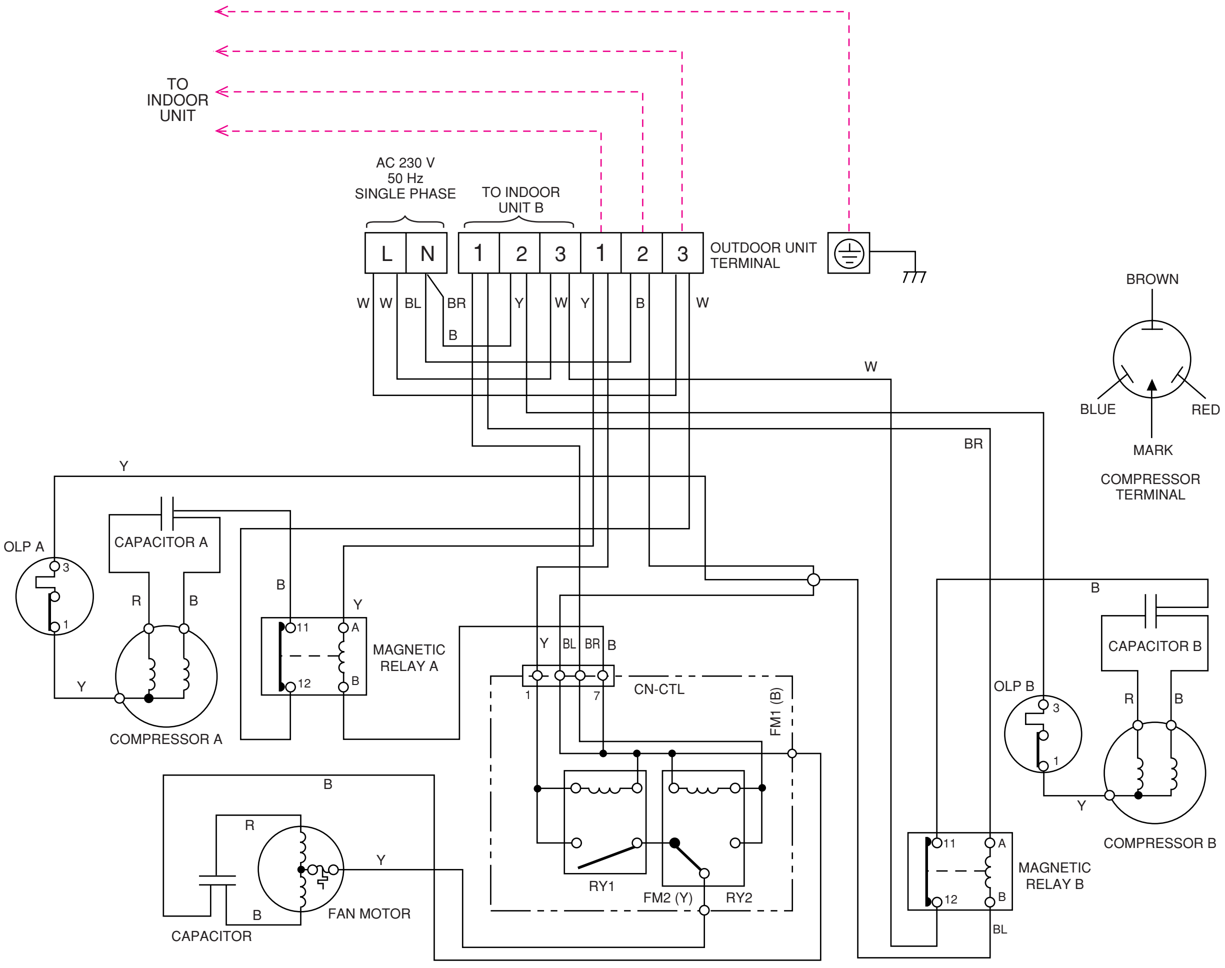
- **CU-2V14BKP5G**

SCHEMATIC DIAGRAM 4/7


COMPRESSOR A
YEL
OLP
RED
BLU
CAPACITOR
BLU
AC(WHT)
COMP-A (WHT)
RY-CA
V-COIL COMPLETE
A
B
(GRN) VH7-4
CN-V
YEL
FAN MOTOR
RED
BLU
CAPACITOR
BLU
ELECTRONIC CONTROL DEVICE
FM(YEL)
FM(BLU)
FUSE 3.15A 250V
AC(BLU)
CR2 Ω120 0.033
RY-VA1
RY-VA2
CR3 Ω120 0.033
RY-FM
CR1 Ω120 0.033
T(BLK)
T(BLK)
ZNR1 511
TRANSFORMER
RED
RED
CN-T VH-2
DB101 S1VB20
IC3 78M12H
12V
C1 2200 35V
IC2 78N05
5V
C2 470 25V
C3 100 16V
GND
R16 1k
R28 100k
ZD1 7.5EL1
C7 1 50V
R27 10k
R25 6.8k
Q7 2SC1740S
Q6 2SC1740S
R26 6.2k
C6 0.01
WHT
BLU
TO POWER SOURCE AC 230 V 50 Hz
N
L
BLU
TO INDOOR UNIT A1
WHT
BLK
WHT
TO INDOOR UNIT
OUTDOOR UNIT TERMINAL
A1 (RED) AC
R1 47k 2W
A1 (RED) AC
R2 47k 2W
PC1 TLP620-1G4
A2 (BLUE) AC
R3 47k 2W
A2 (BLUE) AC
R4 47k 2W
PC2 TLP620-1G4
R7 10k
C9 10 16V
R8 1k
R9 10k
C10 10 16V
R10 1k
X1 4KHz
R15 150k
C12 0.01
IC1 A52C401828CP
R13 10k
28 Vdd
27 OSC 1
26 OSC 2
25 TCAP/PD 7
24 TCMP
23 PD 5
22 PC 0
21 PC 1
20 PC 2
19 PC 3/AD 3
18 PC 4/AD 2
17 PC 5/AD 1
16 PC 6/AD 0
15 PC 7/VREFH
RESET 1
IRQ 2
PA 7 3
PA 6 4
PA 5 5
PA 4 6
PA 3 7
PA 2 8
PA 1 9
PA 0 10
PB 5/SDO 11
PB 6/SDI 12
PB 7/SCK 13
Vss 14
R14 10k
Q3 DTC113ZS
1k
10k
RY-FM
D11
R23 Ω82 2W
C5 470 35V
RY-CA
R19 2.2k
R20 10k
D7 RA15-01
Q1 2SC1741R
RY-VA2
D9
Q4 DTC113ZS
RY-VA1
D10
Q5 DTC113ZS
J2
R17 1k
SW1
MANUAL ←→ AUTO
TEST
NH-2
R18 1k
RA1 10k x 5
BROWN
BLUE
RED
MARK
COMPRESSOR TERMINAL

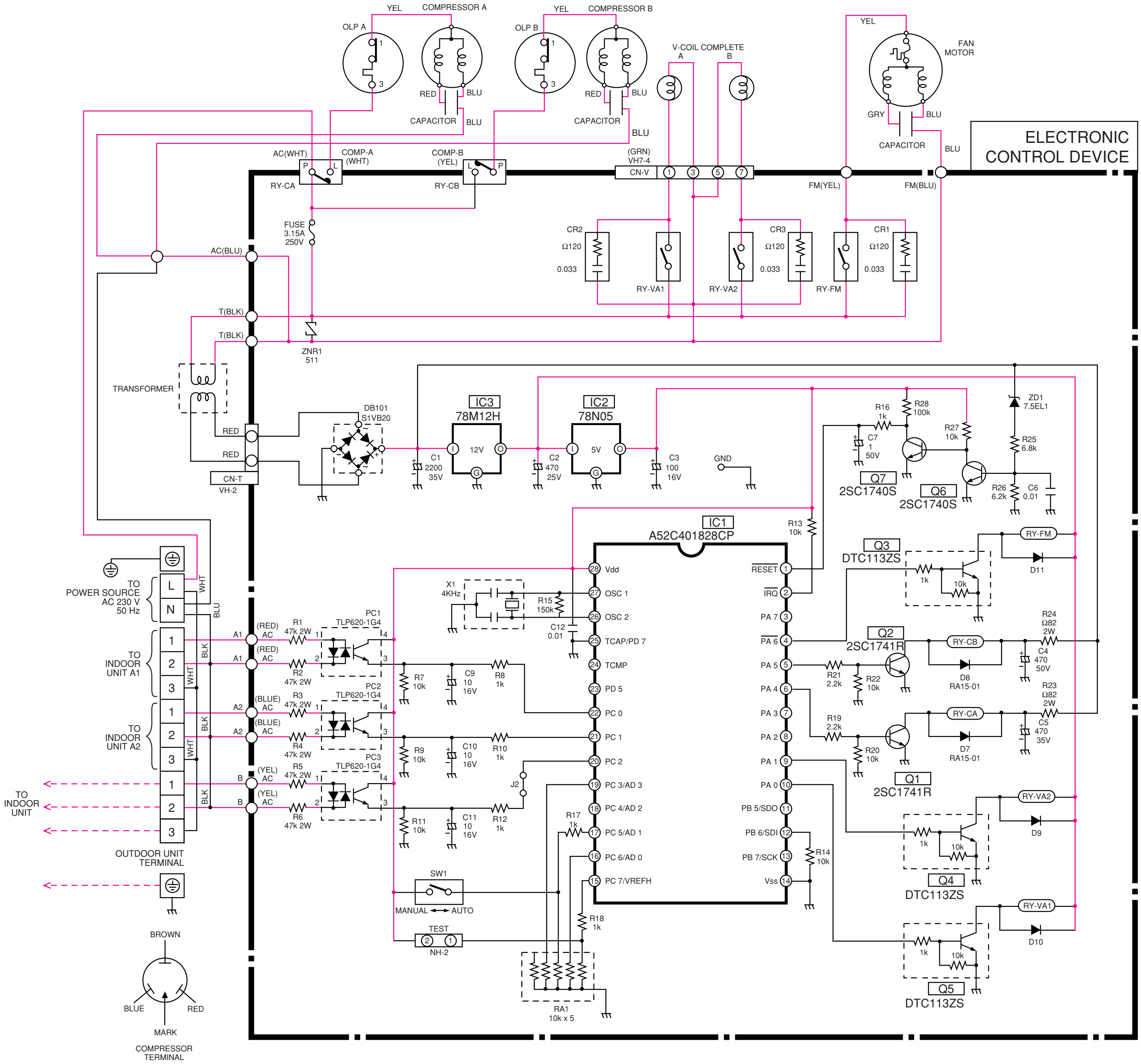
- **CU-2V18BKP5G**

SCHEMATIC DIAGRAM 5/7


TO
INDOOR
UNIT
AC 230 V
50 Hz
SINGLE PHASE
TO INDOOR
UNIT B
L
N
1
2
3
1
2
3
OUTDOOR UNIT
TERMINAL
W
W
BL
BR
B
Y
W
Y
B
W
W
BR
BROWN
BLUE
RED
MARK
COMPRESSOR
TERMINAL
Y
OLP A
3
1
CAPACITOR A
R
B
Y
COMPRESSOR A
B
Y
11
A
12
B
MAGNETIC
RELAY A
Y
BL
BR
B
1
7
CN-CTL
FM1 (B)
RY1
FM2 (Y)
RY2
B
R
Y
B
FAN MOTOR
CAPACITOR
B
CAPACITOR B
OLP B
3
1
R
B
Y
COMPRESSOR B
11
A
12
B
MAGNETIC
RELAY B
BL

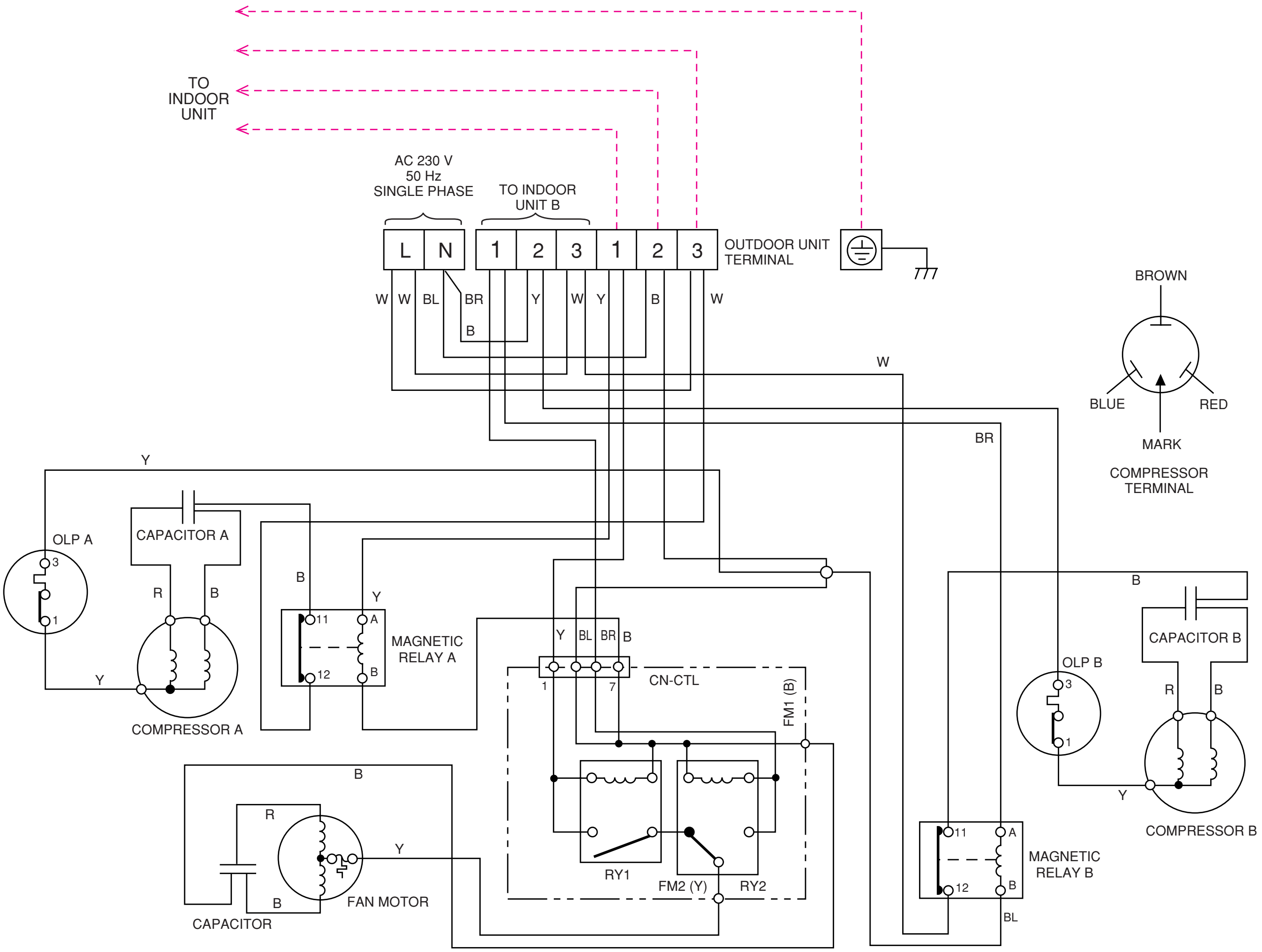
- **CU-3V20BKP5G**

SCHEMATIC DIAGRAM 6/7


ELECTRONIC CONTROL DEVICE
YEL
COMPRESSOR A
OLP A
RED
BLU
CAPACITOR
COMPRESSOR B
OLP B
V-COIL COMPLETE
A
B
FAN MOTOR
GRY
AC(WHT)
COMP-A (WHT)
COMP-B (YEL)
RY-CA
RY-CB
(GRN) VH7-4
CN-V
FM(YEL)
FM(BLU)
FUSE 3.15A 250V
AC(BLU)
CR2 Ω120 0.033
CR3 Ω120 0.033
CR1 Ω120 0.033
RY-VA1
RY-VA2
RY-FM
T(BLK)
T(BLK)
ZNR1 511
TRANSFORMER
DB101 S1VB20
RED
RED
CN-T VH-2
IC3 78M12H
12V
IC2 78N05
5V
C1 2200 35V
C2 470 25V
C3 100 16V
GND
R16 1k
R28 100k
C7 1 50V
R27 10k
ZD1 7.5EL1
R25 6.8k
Q7 2SC1740S
Q6 2SC1740S
R26 6.2k
C6 0.01
R13 10k
IC1 A52C401828CP
Q3 DTC113ZS
RY-FM
D11
1k
10k
X1 4KHz
R15 150k
C12 0.01
Vdd
OSC 1
OSC 2
TCAP/PD 7
TCMP
PD 5
PC 0
PC 1
PC 2
PC 3/AD 3
PC 4/AD 2
PC 5/AD 1
PC 6/AD 0
PC 7/VREFH
RESET
IRQ
PA 7
PA 6
PA 5
PA 4
PA 3
PA 2
PA 1
PA 0
PB 5/SDO
PB 6/SDI
PB 7/SCK
Vss
Q2 2SC1741R
RY-CB
R24 Ω82 2W
C4 470 50V
R21 2.2k
R22 10k
D8 RA15-01
R23 Ω82 2W
RY-CA
C5 470 35V
R19 2.2k
R20 10k
D7 RA15-01
Q1 2SC1741R
RY-VA2
D9
Q4 DTC113ZS
RY-VA1
D10
Q5 DTC113ZS
R14 10k
TO POWER SOURCE AC 230 V 50 Hz
L
N
WHT
BLU
TO INDOOR UNIT A1
TO INDOOR UNIT A2
TO INDOOR UNIT
OUTDOOR UNIT TERMINAL
BLK
A1
A2
B
(RED) AC
(BLUE) AC
(YEL) AC
R1 47k 2W
R2 47k 2W
R3 47k 2W
R4 47k 2W
R5 47k 2W
R6 47k 2W
PC1 TLP620-1G4
PC2 TLP620-1G4
PC3 TLP620-1G4
R7 10k
C9 10 16V
R8 1k
R9 10k
C10 10 16V
R10 1k
R11 10k
C11 10 16V
R12 1k
J2
R17 1k
R18 1k
SW1
MANUAL ◄─► AUTO
TEST
NH-2
RA1 10k x 5
BROWN
BLUE
RED
MARK
COMPRESSOR TERMINAL

- **CU-2V19BKP5G**

SCHEMATIC DIAGRAM 7/7


TO INDOOR UNIT
AC 230 V 50 Hz SINGLE PHASE
TO INDOOR UNIT B
L
N
1
2
3
1
2
3
OUTDOOR UNIT TERMINAL
W
W
BL
BR
B
Y
W
Y
B
W
W
BR
BROWN
BLUE
RED
MARK
COMPRESSOR TERMINAL
Y
OLP A
3
1
CAPACITOR A
R
B
Y
COMPRESSOR A
B
Y
11
12
A
B
MAGNETIC RELAY A
Y
BL
BR
B
1
7
CN-CTL
FM1 (B)
RY1
FM2 (Y)
RY2
B
R
Y
B
FAN MOTOR
CAPACITOR
B
CAPACITOR B
OLP B
3
1
R
B
Y
COMPRESSOR B
11
12
A
B
MAGNETIC RELAY B
BL